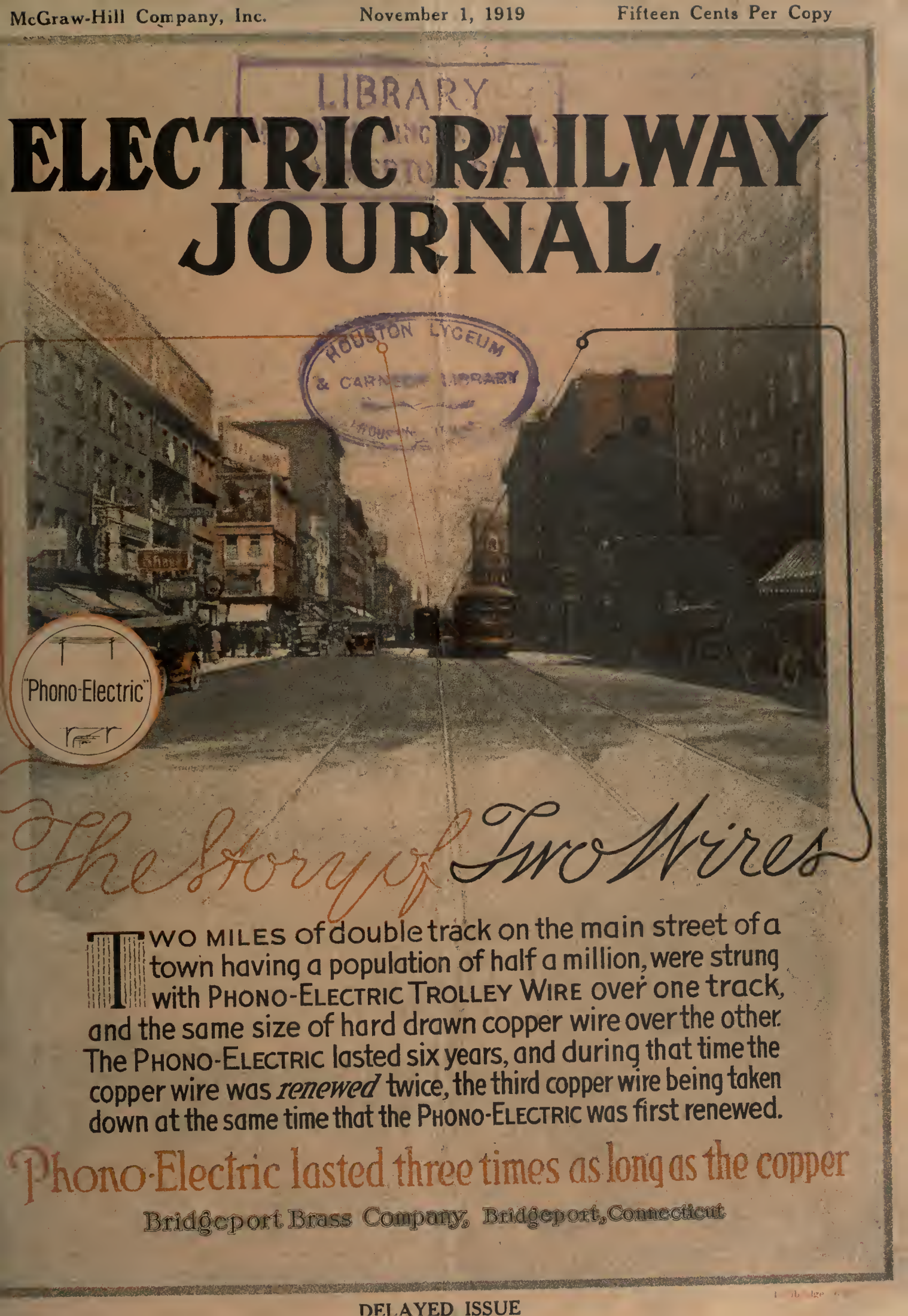


DISCARD



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ELECTRIC RAILWAY JOURNAL

The Story of Two Wires

TWO MILES of double track on the main street of a town having a population of half a million, were strung with PHONO-ELECTRIC TROLLEY WIRE over one track, and the same size of hard drawn copper wire over the other. The PHONO-ELECTRIC lasted six years, and during that time the copper wire was *renewed* twice, the third copper wire being taken down at the same time that the PHONO-ELECTRIC was first renewed.

Phono-Electric lasted three times as long as the copper

Bridgeport Brass Company, Bridgeport, Connecticut



owners of theaters thought they, too, as public entertainers should have equal privileges. Nothing doing, however.

FAST FREIGHT SERVICE between DETROIT AND MILWAUKEE

Mr. Shipper, do you know about the excellent service provided by the Detroit United Lines and connections, daily in both directions?

If not it will be distinctly to your advantage to ask us for details.

Freight shipped from Detroit is delivered in Milwaukee the third morning. Freight shipped from Milwaukee is delivered in Detroit the third morning.

The closing hour for receipt of shipments at our Detroit warehouses, Macomb and St. Aubin streets, is 4 p. m. and the leaving time is 8 p. m.

From Detroit to Muskegon the freight is carried over electric lines. From Muskegon it is carried to Milwaukee by a fast boat

**THIS SERVICE IS RAPID AND
RELIABLE AND THE RATES
ARE REASONABLE.**

Edgewood 3430

Westinghouse Motors and HLF Control

Detroit United Railway

and

Michigan Railway

W

WESTINGHOUSE
ELECTRIC

Westinghouse Motors and HLF Control



Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

Westinghouse

Electric Railway Journal

H. W. BLAKE, *Editor*

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Walter Jackson gives details of bus time-table practices, methods of zone-fare auditing, bonus systems and training, welfare work and other features relative to employees on London's tubes and buses.....Page 816

Utility Commissioners Discuss Railway Problem

The thirty-first annual convention hears many committee reports, some of which are of especial interest to electric railway men. These reports are abstracted in this issue Page 624

New Locomotive for St. Paul Electrification Tested

New type of machine with bipolar motor demonstrates its capability of handling high-speed passenger trains in the Othello-Seattle-Tacoma electric belt. Construction details and results of the test are given.....Page 827

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Circulation of this issue, 6900 copies

Type EL-1 Trolley Ear

Light
Strong
Durable

Will Not
Creep Along
The Wire

Does Not
Obstruct The
Passage of The
Trolley Wheel



Type EL-1 Trolley Ear

Made By
The Green
Sand Core
Method

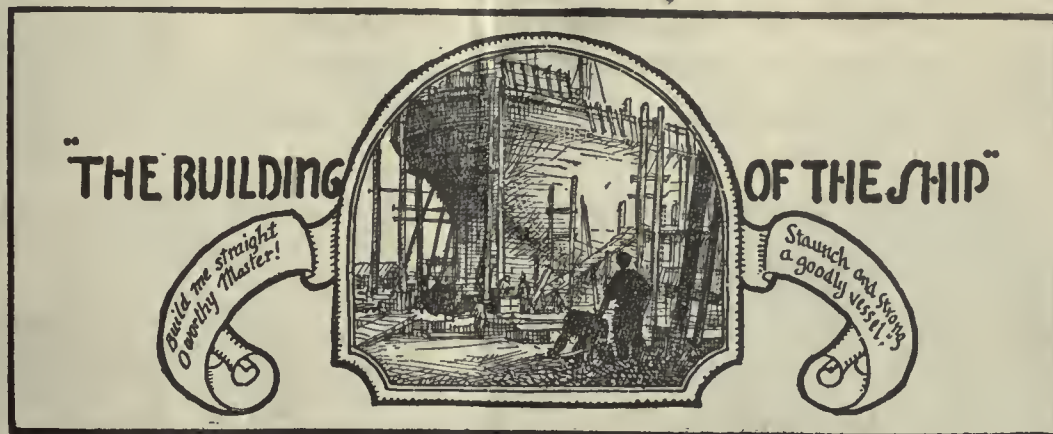
Carried
In Stock.
Prompt
Delivery.

W

WESTINGHOUSE
ELECTRIC

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

Westinghouse



Engineering and Field Forces

*"That with a hand swift and sure
The greater labor might be brought
To answer to his inward thought."*

Early in the building of the air brake Mr. Westinghouse saw and appreciated the necessity for creating ways and means for carrying forward successfully the work he individually had so well begun.

He built shops, installed highest grade machinery and employed the most skillful workmen obtainable. Extensive laboratories were fitted with delicate and accurate testing instruments and placed in charge of a large corps of scientific air-brake engineers.

An exceptionally strong force of trained air-brake experts has been distributed over the railroads to not only assist and advise railroad men in air-brake problems, but to finger the pulse of the close-up air-brake service so as to quickly absorb into the air-brake art the valuable lessons taught by practical experience.

Thus did the "worthy master" not only build his ship "staunch and strong," but he also built up an efficient crew, bending with

*... "Poise and swing
Like the compass in its brazen ring,
Ever level and ever true,
To the toil and task we have to do."*

Westinghouse Traction Brake Company

General Offices and Works, Wilmerding, Pa.

Atlanta, Ga.
Boston, Mass.
Chicago, Ill.
Columbus, O.

Denver, Col.
Houston, Tex.
Los Angeles, Cal.

Mexico City
New York, N. Y.
Pittsburgh, Pa.

San Francisco
Seattle, Wash.
St. Paul, Minn.
St. Louis, Mo.

"BUSINESS FOLLOWS SERVICE"

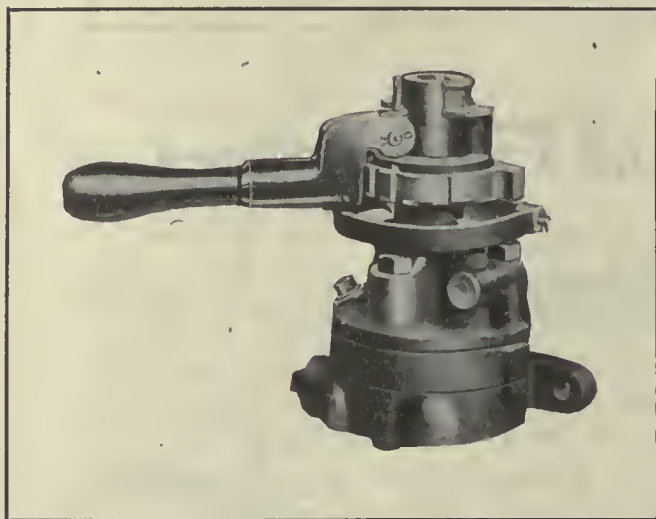
Says E. M. Walker, General Manager

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.

Well, we think that Mr. Walker ought to be a pretty good authority on that subject in view of his achievements at Terre Haute, Ind.

You wouldn't call a place where they don't average more than 21 cents a car-mile a cheerful prospect for good business, but Mr. Walker's experience with Safety Car operation in Terre Haute has shown that

*It's not the gross cents per car mile but
the net cents per car mile that count*



For instance, during the first six months of this year the bigger, old cars earned 21.95 cents per car mile but cost 19.84 cents per car mile, leaving the insufficient difference of 2.11 cents for taxes, fixed charges and the like.

Whereas during the same period, the company's Safety Cars earned only 20.62 cents per car mile, but as they cost but 11.25 cents per car mile to operate, the handsome difference of 9.37 cents was left for taxes, fixed charges, etc. So there you have it from the company's side.

BUT THE PUBLIC ALSO IS PLEASED

Because with the introduction of Safety Car service, 10-minute headways were shortened to 7 and 6 minutes, giving the public so great and so welcome an increase as well as a speeding-up of service that the traffic of the Safety Car lines jumped 43 per cent. That's why

**The Additional Safety Cars That Will Mark Terre Haute's
Leadership In Service Are Being Financed By Local Bankers!**

Terre Haute's Public-Pleasing and Money-Making Cars are Safety Cars because they are equipped with automatic, laborless apparatus, so interlocked that, regardless of the illness or distraction of the operator, the power will be cut off instantaneously, the air brakes and sander applied immediately thereafter, and the doors unlatched for safe and easy exit. Furthermore, it is a Safety Car only when the doors must be closed and the step folded before the car can start, and when the air brake must be applied before the doors are opened and the step lowered in bringing the car to a service stop.

SAFETY CAR DEVICES COMPANY

Main Office—Boatmen's Bank Building, ST. LOUIS

CHICAGO
Railway Exchange Building

NEW YORK
City Investment Building

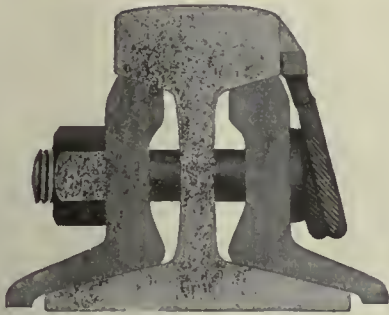
PITTSBURGH
Westinghouse Building

CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.



PRODUCTS

Quality First



O-B Type AW3 on Ball of Rail Patented beveled terminal is not likely to receive blows. If it does it is less liable to damage. This is the patent that makes possible the 90° welding angle.



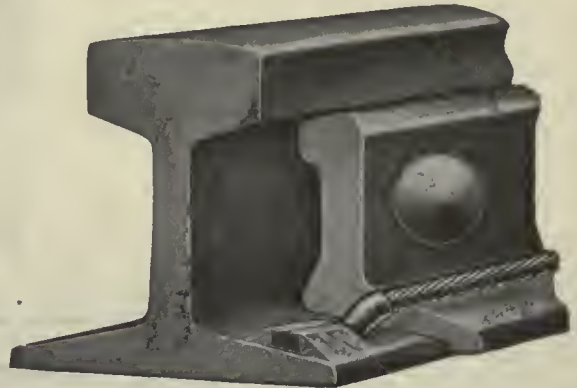
In an acute angle the arc plays against one side and misses the bottom of the scarf.



In a right angle the arc makes a good weld down in the corner



O-B Type AW3 Bond (Patented)



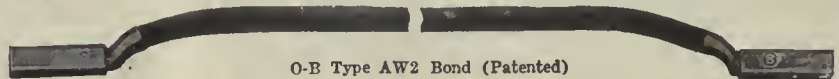
O-B TYPE AW2 on Base of Rail

90 Degree Welding Angle Is the Secret of Good Bonding

O-B Arc Weld Bonds make a right angle with the rail.

Even an experienced welder fails to get a good job in an angle of less than 90°. The arc follows the line of least resistance—the shortest path to ground. So in an acute angle the arc plays against one side and merely drops hot metal on the other side.

In a right angle the arc plays equally on both sides and effects a strong, permanent union in the corner—the vital spot in rail bonding.



O-B Type AW2 Bond (Patented)

O-B Arc Weld Bond Terminals are encased in a steel sleeve, mechanically and electrically united with the copper in the factory. On the job, the operator welds "Steel to Steel with Steel"—the easiest sort of electric welding.

O-B Arc Bonds may be used with any of a number of the welding machines now on the market.

SEND FOR BOOKLET

THE OHIO BRASS COMPANY

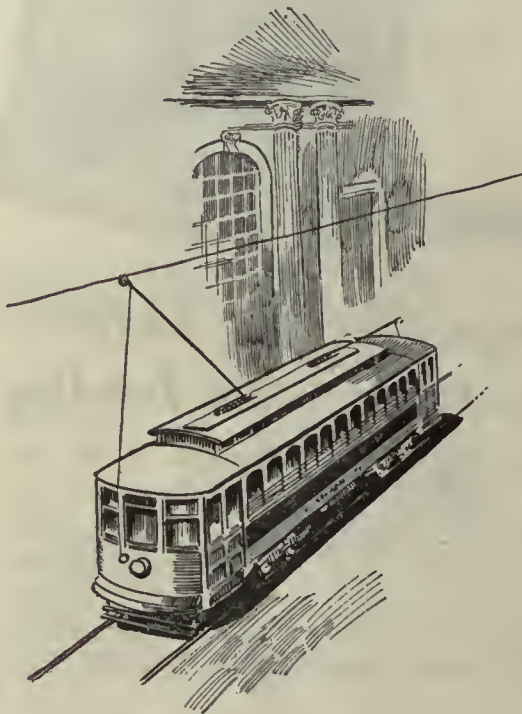
MANSFIELD, OHIO

NEW YORK PHILADELPHIA PITTSBURGH CHICAGO LOS ANGELES SAN FRANCISCO

Rome-Wire

Rome-Wire

A Well Known Symbol of Service



M AINTENANCE and replacement costs of electric railway systems depend largely on the quality of the materials used; and especially does this apply to electrical conductors, particularly trolley wires which are subjected to extremely severe usage and should therefore be selected for durability and economy, two big features of ROME trolley wires. Feeder cables, car wires, bell and magnet wires made in the ROME-WIRE plant ALL have the same accuracy of gauge, and superiority of finish, and the fact that they have been adopted by the many electric railway systems is proof of their ability to render the kind of service that has made the name ROME-WIRE so popular.

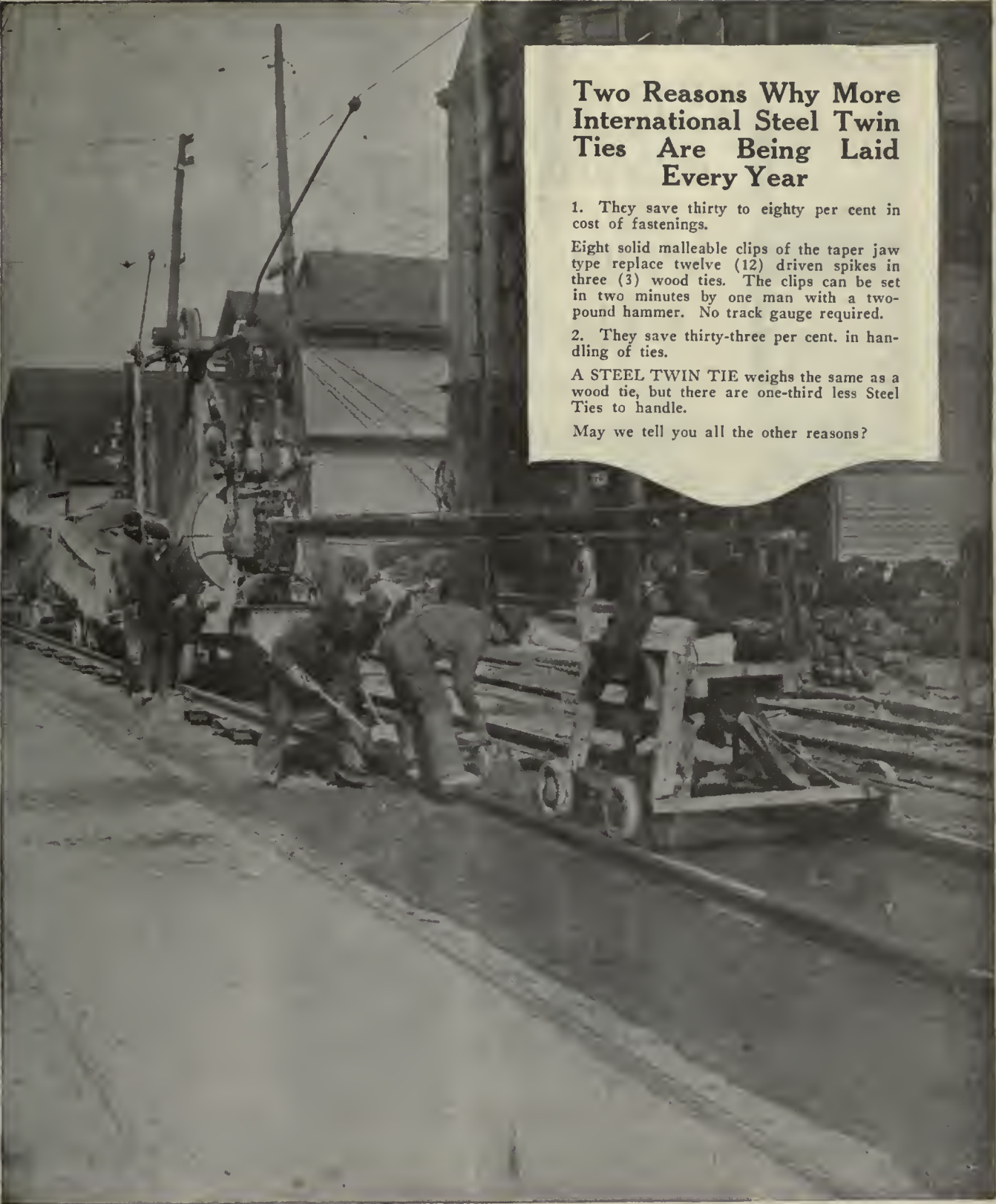
The prompt shipment of all orders is another feature of ROME SERVICE worth consideration.

Rome
Wire Company
Rome, N. Y.



All Operations from Wire Bar to finished Product in this Plant

Rome-Wire



Two Reasons Why More International Steel Twin Ties Are Being Laid Every Year

1. They save thirty to eighty per cent in cost of fastenings.

Eight solid malleable clips of the taper jaw type replace twelve (12) driven spikes in three (3) wood ties. The clips can be set in two minutes by one man with a two-pound hammer. No track gauge required.

2. They save thirty-three per cent. in handling of ties.

A STEEL TWIN TIE weighs the same as a wood tie, but there are one-third less Steel Ties to handle.

May we tell you all the other reasons?

The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

General Sales Office and Works: Cleveland, Ohio

SEMAPHORE

PROCEED



STOP



CAUTION



PROCEED



FOR DOUBLE TRACK *Interurban Railways*

Union automatic
 □ block signals □

afford a simple system of indications easily understood by trainmen.

The continuous A. C. track circuit makes possible the use of "polarized" or "wireless" control and insures the display of the proper indication at all times.

LIGHT

PROCEED



STOP



CAUTION



PROCEED



On the New York State Railways



On the Oakland, Antioch and Eastern

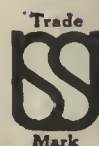
UNION EQUIPMENT WILL SOLVE YOUR INTERURBAN
 TRAFFIC PROBLEMS

Let us study your operating conditions and cooperate with you in considering
 what *automatic block signaling* will do for *your line*.



Union Switch & Signal Co.

SWISSVALE, PA.



A Headlight is a good Headlight Only when it has a Good Reflector The "GOLDEN GLOW"



"GOLDEN GLOW" mirror reflectors are made of a special greenish-yellow glass and retain their initial high efficiency indefinitely. They are the only accurately ground and polished parabolic mirrors on the market which can be manufactured and sold at a commercial price.

Write for data sheets

ELECTRIC SERVICE SUPPLIES Co.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Streets

NEW YORK
50 Church Street

CHICAGO
Monadnock Building

Canadian Distributors: Lyman Tube & Supply Co., Montreal, Toronto, Winnipeg

Announcing

Holden & White Electric Car Heaters

The Simplest, Lightest, Safest and
Most Durable Heaters ever pro-
duced for electric railway cars



Truss Plank Type, interior view showing
Cutler-Hammer heating units



Vestibule Type

Full line of heaters for Cross Seat, Panel, Truss Plank and Vestibule service. Ranging in wattages from 300-watt single unit to 2,000-watt four unit heaters. Voltages to operate with units in series of 2, 3, 4, 5, 6 and 8. Heaters consist of 1, 2 and 4 units.

Using
Cutler-
Hammer
Units

Send for Catalogue giving full description

Holden & White Inc.

817 Fisher Building, Chicago

Eastern Representative, National Railway Appliance Co., New York, Washington



This man installed this Armco Iron Culvert 12 years ago

This man installed this Armco Iron Culvert 12 years ago. This photograph was taken recently, just after he had inspected it and found not the slightest evidence of deterioration.

The enduring qualities of culverts of rust-resisting Armco Iron have been proved by hundreds of installations in all parts of the country, made 10 years ago or earlier, and in perfect condition today. Armco Iron culverts are the culverts for the permanent road.

There is a manufacturer in nearly every State and in Canada, making genuine rust-resisting ARMCO IRON CULVERTS and other products of ARMCO IRON, such as flumes, siphons, tanks, road signs, roofing, etc. Write for full information and nearest shipping point on products in which you are interested.

Armco Iron Culvert & Flume Mfrs. Assn.

TRANSPORTATION BLDG., CHICAGO





Thermit welded track on Bowery near Chatham Square. One of the many examples of Thermit rail economy

Rail Economy Means Real Economy **Thermit Insert Welds**

secure ultimate rail economy and real economy by obliterating rail joints and rail joint maintenance. The Thermit steel causes the ends of the rail to fuse together forming one homogeneous mass. In this way your rail becomes one continuous piece of solid steel equally strong at any point.

Approximately two-thirds of the track maintenance is done away with and the stronger, smoother foundation made with Thermit Insert Welds cuts out considerable maintenance on the cars themselves.

Years of experience with Thermit Insert Welds widely distributed throughout the United States and involving such extremes of climate and temperature as found in San Antonio, Youngstown, New York City, Pittsburgh, Milwaukee, Indianapolis, Omaha, Kansas City, Baltimore and many other places have proved conclusively that Thermit Insert Welds are not affected by heat or cold on the hottest summer or the coldest winter day and that cupped rail joints have become a thing of the past.

Write today for Pamphlet 1232 or have our representative call on you.

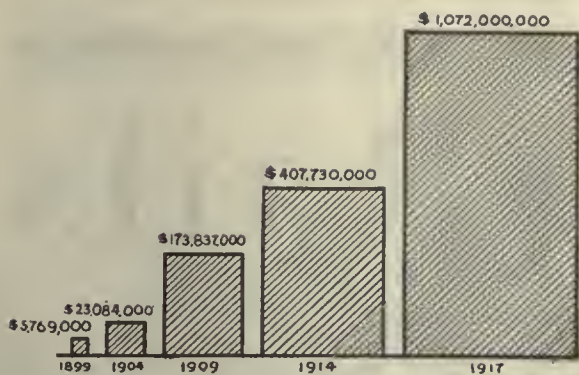
Send for Pamphlet Number 1232

METAL & THERMIT CORPORATION
120 BROADWAY, NEW YORK

329-333 Folsom St., San Francisco
7300 So. Chicago Ave., Chicago

Factories located at Chrome, N. J.; Wyandotte, Mich.; East Chicago, Ind.; Jersey City, N. J.

15 Emily St., Toronto, Ont.
1427-1429 Western Ave., Pittsburgh, Pa.



(Compiled by Montgomery & Co., New York.)

Growth of Investment in Automobile Manufacture

Capital May Be Timid

BUT you can't scare the interests behind an amount like a billion dollars or more by pointing out how unfair it is to make electric railways pay for paving worn out by motor vehicles.

The road to relief from excessive paving changes is a hard one and slow.

The road to relief from excessive expenses in "Con-

ducting Transportation" is an easy one and quick.

Just Equip Your Present Cars with National Pneumatic Door and Step Control, including Safety interlocking,

And you will secure a saving in operating expenses and an increase in revenue that will make any mere reduction in paving charges and taxes look small and picayune indeed.

NATIONAL PNEUMATIC COMPANY

INC.

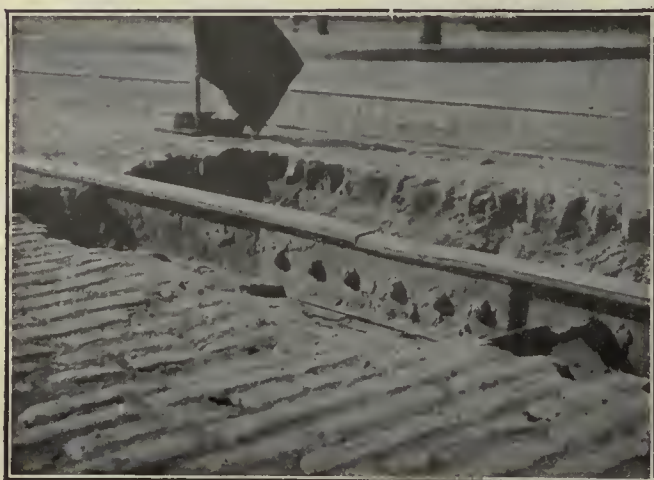
50 Church St., New York



Edison Bldg., Chicago

Works: Rahway, N. J.

Save the Rails



There is only one alternative—the relatively early replacement of the track, the rebuilding of the roadbed and the replacement of the pavements to say nothing of regrounding flat car wheels and repairing motors damaged by excessive pounding. The

Reciprocating Track Grinder

has clearly and conclusively shown its ability to greatly prolong the useful life and service of track—in many instances increasing the rail life 15 to 40 per cent.

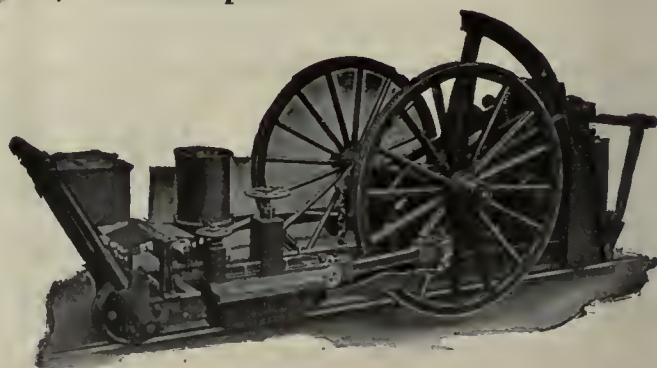
It has done this in cases where stretches of track were in such bad condition from corrugations and cupped joints that replacements seemed the only remedy. The Reciprocating Track Grinder restored the rails to useful service where other types of machines had been tried and found unsatisfactory.

Let us prove this on your tracks at our risk.

Railway Track-work Co.

30th and Walnut Sts., Philadelphia

**Save the Rails—
Start To-day!**





Strength

Brute strength—the ability to lift the car without fail when time, perhaps lives, are at stake—is a special characteristic of the Duff Emergency Car Jack (No. 239).

All parts are of ample size and made of the highest quality material. The main lifting parts are drop forged of chrome nickel steel and heat treated.

The claw is a large drop forging capable of lifting on its foot the entire load.

The base, of finest malleable iron, is ribbed at points where the greatest strain comes like a steel I-beam.

The rated capacity of the jack, 15 tons, is conservative.

Write for Bulletin No. 117 giving full description.

THE DUFF MANUFACTURING CO., Pittsburgh, Pa.

New York, Chicago, Atlanta, San Francisco



Making Track as Permanent as the Paving



Lesson No. 10:

The Resiliency of Dayton Mechanical Ties Absorbs the Shock of Travel Perfectly

The asphalt cushion is the most notable single feature of Dayton Mechanical Ties. It forms a rubber-like buffer which serves to absorb the vibrations set up by constantly passing cars, and it provides ample expansion facilities to protect track from distortion due to severe temperatures.

Ordinary wood ties have some resiliency, but the Dayton Mechanical Tie combines the resiliency of *wood and*

asphalt, with the result that none of the shock and jar of passing travel is transmitted to the concrete in which the tie is embedded—the pounding which would otherwise pulverize the concrete surrounding the tie is completely absorbed.

And, the resiliency of Dayton Mechanical Ties means increased comfort to passengers, less noise, and longer service from rolling stock.

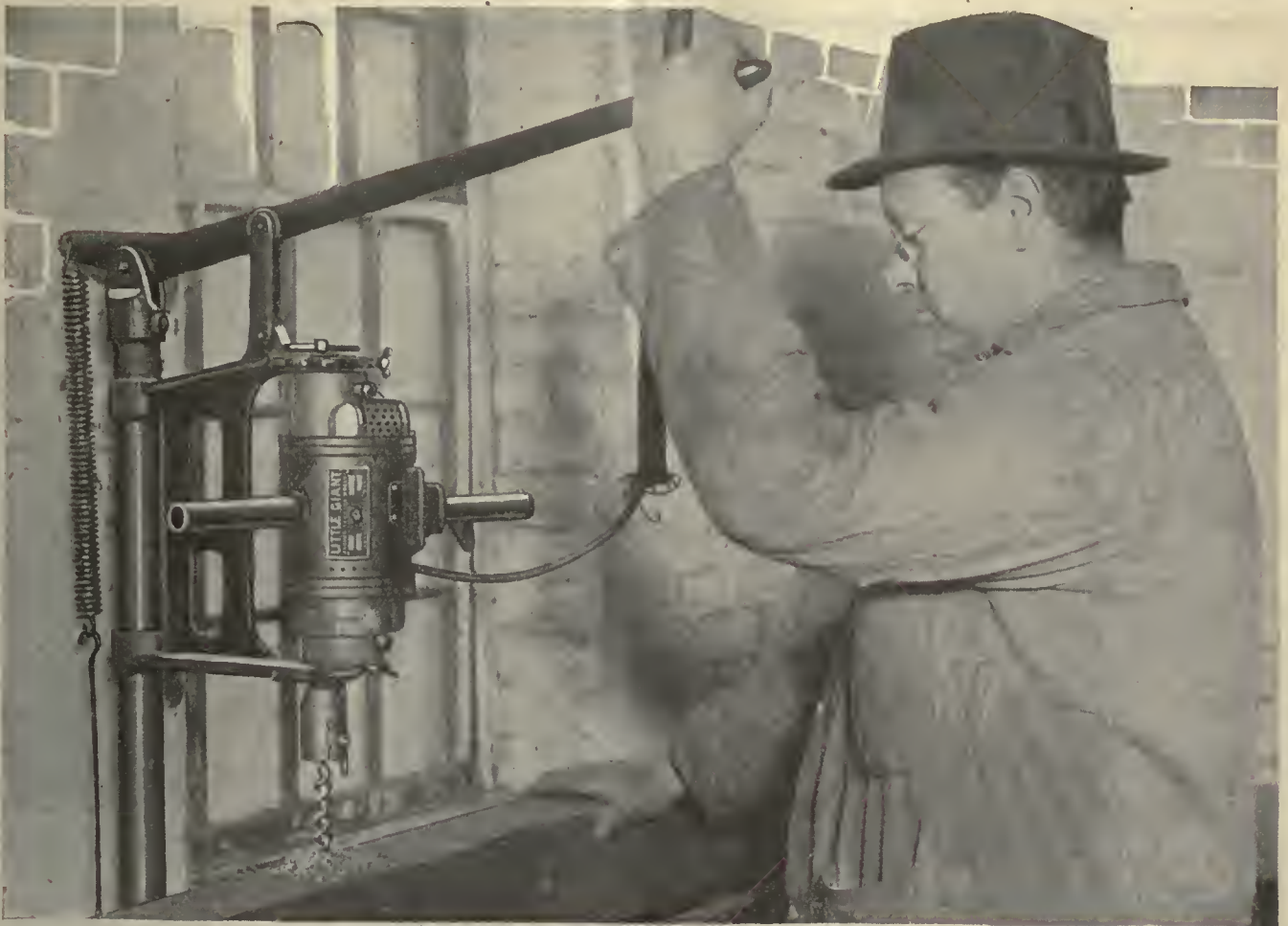
We will gladly supply full information on request.



THE DAYTON MECHANICAL TIE CO.

704 Commercial Bldg.
DAYTON, OHIO





Drill Press or Portable Drill—30 Seconds to Change

LITTLE GIANT Portable Electric Drills may be quickly converted into an accurate sensitive Drill Press by clamping them into a Little Giant Drilling Stand. This simple, rugged device is proving of tremendous value in shops and factories everywhere, where it is at times desirable to provide a stationary drilling apparatus which may be as quickly reconver-

New uses for Little Giant Portable Electric Drills are being discovered daily. Wherever there is an electric socket they may be put quickly to work. Built in a variety of sizes A.C., D.C. and Universal Types. Write for Bulletins describing Portable Drills and Drilling Stands

ted into a portable tool for general drilling, reaming and wood boring operations about the plant. If you are already increasing your output with Little Giant Portable Electric Drills, enlarge their utility still further by adding Little Giant Drilling Stands to your equipment. If you have yet to enlist the unusual pulling power, low temperature rise, easy control, speed and economy of Little Giant Electric Drills in your service, install Little Giant Drilling Stands when you install the drills.

Chicago Pneumatic Tool Company, 1062 Fisher Building, Chicago

Sales and Service Branches all over the World

BIRMINGHAM	CINCINNATI	EL PASO	JOPLIN	MINNEAPOLIS	PITTSBURGH	SALT LAKE CITY	ST. LOUIS	BOMBAY	HAVANA	CHRISTIANIA	MONTREAL	SEOUL	TOKYO
BOSTON	CLEVELAND	EL PASO	LOS ANGELES	NEW YORK	PORTLAND	SAN FRANCISCO	TUCSON	BRUSSELS	HONOLULU	LONDON	OSAKA	SYDNEY	VANCOUVER
BUFFALO	DETROIT	EL PASO	MILWAUKEE	PHILADELPHIA	RICHMOND	SEATTLE		FRANKFURT	JOHANNESBURG	MILAN	PARIS	TOKYO	WINNIPEG

EL-14

BOYER PNEUMATIC HAMMERS • LITTLE GIANT PNEUMATIC AND ELECTRIC TOOLS
CHICAGO PNEUMATIC AIR COMPRESSORS • VACUUM PUMPS • GIANT FUEL OIL, GAS,
GASOLINE AND STEAM ENGINES • ROCK DRILLS • COAL DRILLS

LITTLE
Electric



GIANT
Tools

The Various Angles of Want Ad Columns

Condensed from an article by S. E. Perlman in Advertising & Selling

THE difference between a want ad and a display ad is the same as that between a ride in a street car and a ride in a Pullman coach. The street car is used for short, quick travel. The ride in the Pullman coach may take anywhere from several hours to several days.

Selling a second hand piano through a want ad can be done at a trifling cost—car fare, so to speak. Goodwill advertising, like the Pullman ride, requires the use of the bill purse. The campaign must be planned carefully and is usually a long and slow process.

The want ad is here to stay. It can be found in all papers—dailies, weeklies, monthlies, class and trade publications—those read by the business man, the professional man, the artist, and even the "gentleman of leisure."

The want ad idea is growing steadily.

* * *

The Growth of Want Ads

Although the rate of increase during the past few years has been exceptionally rapid, the development of the want ad idea can be traced back over a hundred years. In the newspapers read by our great grandfathers, the business card, the special sale advertisement, the help wanted ad and the exchange ad were all thrown together.

* * *

As the volume of advertising and news matter increased, and papers grew in size, the man who wanted to swap a horse for a piece of land had great difficulty in finding an advertiser who offered a piece of land in exchange for a horse. Hence, the establishment of the exchange column, and in time the personal column, and later the classified column, so far the best method that has been devised for serving both the advertiser and the reader.

The exchange column succeeded at once because of its closeness to the everyday needs of the people.

Life became more complex. Different kinds of wants arose and the highly organized

present-day classified column became necessary. The range of classifications in the bigger want ad media is almost unbelievable.

* * *

Class and trade publications naturally follow more limited lines. While they do

*"Class and trade publications * * * exert a more powerful and specialized appeal in their own fields."*

The Most Powerful Mediums In Engineering Fields

for Advertising Wants and other special "Opportunities," are the

SEARCHLIGHT SECTIONS

OF MCGRAW-HILL PUBLICATIONS:

American Machinist	Electric Railway Journal
Electrical World	Engineering and Mining Journal
Power	Chemical and Metallurgical Engineering
Engineering News-Record	Electrical Merchandising
Coal Age	Ingenieria Internacional

Each is the Leader in its Field

"SEARCHLIGHT" is the best-known and most widely used advertising of "Opportunities" in engineering fields in the world. Over 110 pages—more than 1200 advertisements—a week.

For Employment, Equipment and Business Opportunities

Think "Searchlight" First!

not have the scope of action that the general newspapers have, they exert a more powerful and specialized appeal in their own fields.

* * *

The use of want ads is growing rapidly, but this growth is due more to the ingenuity of the public itself in adapting the classified columns of papers to their ever increasing wants, than to the enterprise of publishers.

* * *

If it were possible to evolve a magnet which would attract not only one metal, but certain specific sizes and shapes, colors and

grades, we would have in the mechanical field what the want ad is in the field of human relationship.

* * *

Reason for Promoting Want Ad Business

Want ad business is vigorously sought for and is considered a very desirable feature by practically all papers.

* * *

A newspaper that consistently carries a large volume of want ads must have not only a big circulation but one that is strong and sound. The presence of many columns of want ads constitutes direct proof that

the paper is widely read. Circulation and want ads are mutually dependent and mutually helpful to a large extent. The foliage on a tree not only aids its growth, but is itself an evidence of growth and condition. A big want ad section is the best evidence of a healthy condition in the paper that carries it.

A want ad section can in a manner move forward by its own power. For instance, the case of the person who inserts a "Situation Wanted" ad and while waiting for replies answers some of the "Help Wanted" ads in the same paper. As the advertisers secure satisfactory results the reputation of the paper grows and attracts more readers. More readers mean more want ads and so it goes, hand over hand. Of course this process needs vigorous and intelligent stimulation and a close coordination of the various branches of the newspaper organization and, especially, a well-balanced and closely knit want ad department.

* * *

In other words, want ads form a strong link in the

chain of service that the newspaper should give. As far as revenue is concerned, whether or not the want ad department is self-sustaining it is always an important source of indirect profit.

* * *

Just as there are certain display ads prepared by a master hand that give a thrill of delight to those who read them, so there are want ads that stand out from the common run like the one sensible gift in a collection of Christmas presents.

* * *

Perhaps no one is better fitted to tell of the need for more intelligent copy in want ads than the clerk who gives the advertisers their replies.



**The Dweller Near
The Right of Way Demands**



The dweller near the right of way demands that railway cars and trains make as little annoying noise as possible. Car wheels with slid-flats tend to annoy the right-of-way-dweller. But cars equipped with Davis Steel Wheels bring forth no complaints, for slid-flats are scarce among Davis Wheels. The hard manganese tread is the reason.

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DAVIS STEEL WHEELS



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HERE is not a better or more favorably known black friction tape manufactured than Holdtite. It is heavily coated on both sides with a high grade compound, and is recommended for general electrical work.

Relio is a black, unvulcanized splicing compound that contains no sulphur, is adhesive, and will form a solid waterproof joint without heating. Relio is suitable for either outside or inside work.

United States Tapes
are Good Tapes

United States Rubber Company



FAITH

in the

WHITE PRODUCT



If the installations of White Truck fleets in commercial service were expressed in terms of money, they would furnish impressive evidence of the faith

large truck users have in White performance. The following figures show some of the large investments represented by individual fleets.

1 owner has invested over	\$2,000,000
2 owners have invested between	1,000,000 and \$2,000,000
5 " " " "	500,000 and 1,000,000
6 " " " "	300,000 and 500,000
15 " " " "	200,000 and 300,000
41 " " " "	100,000 and 200,000

These figures do not include any trucks owned by the United States or foreign governments

When the large user standardizes on White Trucks, acquiring more of them every year, he must *know* their operating merit. When he invests a quarter million, half a million, two to three millions, in White Fleets, he must have implicit faith in their investment value.

What safer example could be afforded the truck buyer who does not have a broad comparative experience of his own to guide him? Investment value in the case of a single truck depends upon earning power quite as much as in the case of a large fleet.

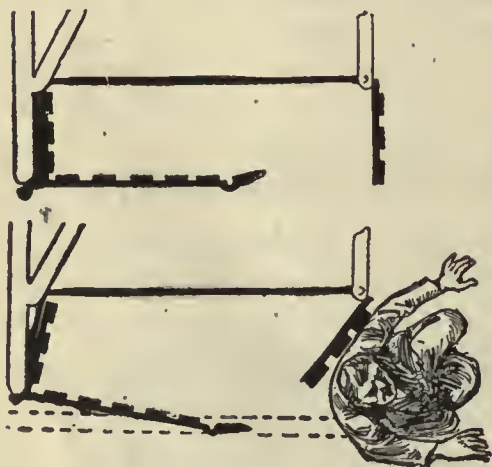
THE WHITE COMPANY
CLEVELAND



H-B Salvavidas en Camaguey, Cuba

Meaning

H-B Life Guards in Camaguey, Cuba



Note this car. Looks like it has everything a good car should have. Even the platform men are uniformed in white.

But most important of all, this car is equipped with the

H-B Life Guard

recognized as the standard life-fending device of America, Cuba and many other countries. It is recognized as the one device that never fails to operate—it is automatic—it never fails to protect. And the cost is insignificant.

Its use means a

"Barrier of Safety" between the fallen pedestrian and the car wheels

THE CONSOLIDATED CAR FENDER COMPANY
PROVIDENCE, R. I.

General Sales Agent **WENDELL & MACDUFFIE CO.** 61 Broadway, N. Y.

50 Years of Galena Experience

Some one has well said that "to some men experience is a ladder by which they climb to new achievements, while to others it is a rut from which they never get out."

Every year of the half century of experience that lies behind

GALENA OILS *and* GALENA SERVICE

has been a year of progress in better lubrication methods. There is a big difference between the experience that is 50 years *old* and the experience that is 50 years *young*.

There are just as many difficult problems in lubrication methods today as there were 50 years ago.

Galena Service brings to their solution the same fresh vision that has been typical of Galena methods always.

After 50 years we are still willing to grow.

It is that spirit *coupled* with experience that makes Galena Service so valuable to the electric railway industry.

Galena-Signal Oil Company

Franklin, Pa.

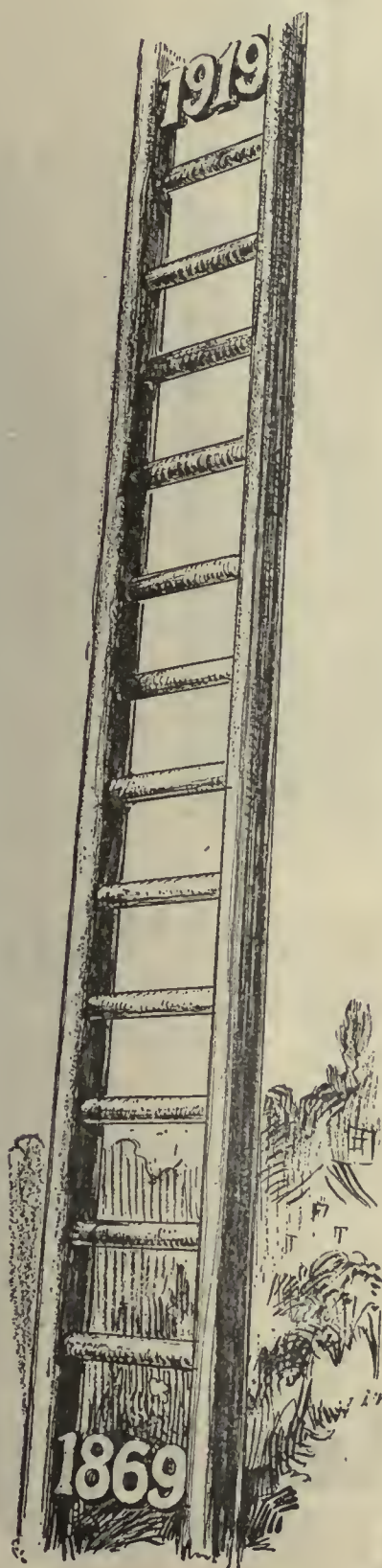
Works at Franklin, Pa. Parkersburg, W. Va. Whiting, Ind.
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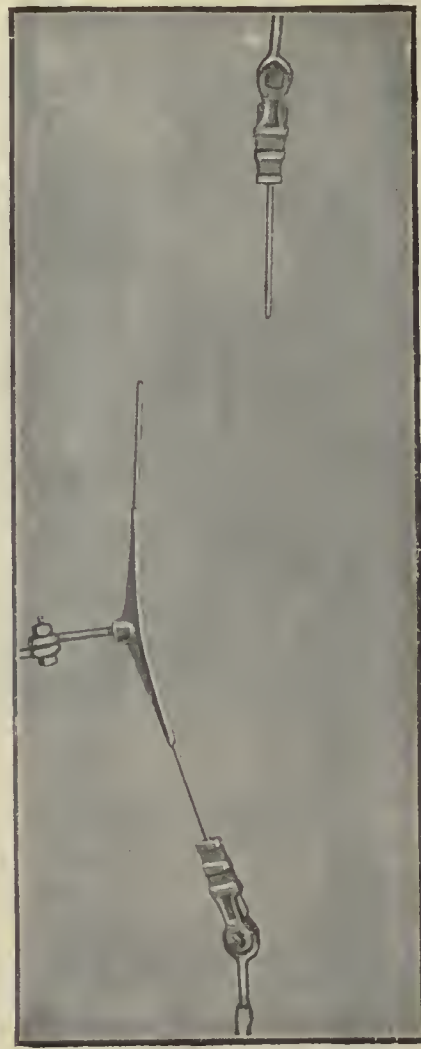
PARIS

BUENOS AIRES





THE HEAVY STRAIN BENDS THE EAR
BUT THE EAR DOES NOT LET GO



AND FINALLY BREAKS THE WIRE

G-E Composition Metal Clinch Ears

Milled slot ears are better than rough finished ears because the smooth slot gives more bearing surface on the wire which means greater friction and, therefore, greater holding power.

HERE IS THE PROOF

A G-E ear, selected at random from stock, was clinched on a brand new piece of 3/0 trolley wire. The wire was then clamped in a pulling machine and the ear subjected to strain until the wire broke. There was absolutely no sign of the ear's loosening its hold on the wire.

G-E Clinch Ears will hold any strain up to the breaking point of the wire. They are made for round and grooved wire.

Order them from stock.

General  **Electric**
General Office **Company** Schenectady, N.Y.

Electric Railway Journal

This is a delayed number of this paper and is issued on Nov. 26

Volume 54

New York, Saturday, November 1, 1919

Number 18

Company Section Activities Are Due to Begin

DURING the war period there was a necessary let-up in the work of the American Electric Railway Association company sections. Meetings were maintained against all kinds of opposing influences. As a result, comparatively few papers of conspicuous merit were presented, and there was a marked tendency to devote the meetings largely to social relaxation, presumably as an offset to the depressing effect of war. Now is the time to forget the past and to plan for an aggressive campaign for the winter season. We hope that, without neglecting the social features, the chief emphasis will be placed upon constructive and inspiring addresses and papers, with the object of conveying information that the hearers want rather than that which the speakers are most anxious to impart.

One trouble with the company section paper, speaking broadly, has been that it was either over the heads of the audience or outside of its range of interests. It requires a peculiar knack to tell a story in terms that the listeners will understand. We suggest that in inviting speakers for the coming season, the program committees ask them well in advance to study carefully the prospective audiences which they will later face.

Connecticut Company Zone Plan Seems to Be Working Smoothly

AS THIS editorial is written the zone system has been in operation on the lines of the Connecticut Company for nearly two weeks. As was explained in an earlier editorial, the plan was adopted only after very careful traffic study and analysis of all possible methods of increasing the company's revenue. Although there have been numerous protests against the increases in fare which accompanied the inauguration of the zone system, and although there will undoubtedly be requests for investigation which the Public Utilities Commission will be obliged to heed, on the whole the clientèle of the railway company has taken the situation reasonably. It will now be up to the public to show that the rates of fare are so high as to bring an undue financial reward to the company, or are discriminatory as among different classes of patrons. To do this will, in our opinion, be difficult because, obviously, the company has worked out its rate schedule on the basis of charging no more than is actually necessary to keep the property going and giving the needed service.

The minimum fare on the Connecticut Company's system is 6 cents, as compared with 5 cents on the Public Service Railway, but the Connecticut Company officials were convinced that they could not give service in what appeared to them to be the ideal zone layout for this fare, and in view of the fact that the 6-cent fare has been in use in Connecticut for two years it seemed best to give the maximum service that could be given for that fare.

Those who are convinced that the zone system is right in principle and can be made right in practice, the number of whom we believe is increasing, will be encouraged by the results so far achieved in Connecticut. While all may not agree as to the details of the plan used there, it must be conceded that as it is highly important to have a number of properties operating under this plan in order that the imperfections may be worked out and public confidence may be secured the Connecticut Company is to be commended for getting something started. The plan which was adopted seems to us to be fundamentally sound, and we hope that it may appeal to the sober judgment of our friends of the Nutmeg state, or as the people themselves prefer to call it, "The State of Steady Habits."

As far as one can judge from observation of the new plan in practice and from discussion with employees of the company, the Connecticut Company firmly believes that it is practicable on this property. Such conviction will go a long way towards convincing the public. Although a great deal of general educational work has been done by way of advertising, verbal explanation, etc., it will be up to the platform men of the company, largely, to "sell" the plan to the public. For example, its motormen can hand zone checks to incoming passengers in such a way as to make the passengers feel that they have been the recipient of courtesy, or the motormen can make the passengers feel that it is an imposition to bother them with zone checks. Again, the conductors can very greatly facilitate the payment of fare and the alighting passengers, or they can develop any incipient tendency that the passengers may have in the direction of a "grouch." In other words, if the company management cannot sell the zone plan to its employees, it cannot sell this plan to the public. In Connecticut every effort was made to show the employees, apparently with success, that if the plan is good for the company it is good for them. We feel that the demonstration will have been as much an achievement in good salesmanship as in giving good service if the Public Utilities Commission ultimately puts its stamp of approval on the zone plan.

Bus Facts

Versus Bus Fancies

THERE is already a distressing amount of evidence that we are facing an era of bus-line promotion that threatens to repeat the worst features of the hey-day period of the electric railway. The undoubted utility of electric railways was exploited in the old days by more than one promoter whose enthusiasm lead to the building of the roads but not to the paying of the promised roseate dividends. So, too, the undoubted value of the motor bus is the starting point for a later generation of what *The Spectator* used to term "projectors."

These thoughts are prompted by an examination of recent financial literature on the motor bus. The results with new routes are predicated upon returns obtained elsewhere under far more favorable conditions and in a far more favorable period of costs. For example, the motor bus operations of London are quoted as being highly profitable, whereas the rate of return has been badly below bank interest in the last two years or more, while the operations of the current year show a deficit. Of course, the reason is that labor and material costs have gone up much faster than income. To offer bus stock as a good investment upon the basis of what some other company earned in pre-war times is as misleading as it would be to try to sell street railway stock on the same basis. Indeed, the bus has suffered even more than the electric railway through increases in the dominant item of wages because the number of passengers per bus operative is decidedly less than per car operative.

The bus promoter is also likely to be too sanguine about the item of depreciation and obsolescence. The latter, in these days of rapid development of vehicles, actually may lead to the scrapping of the bus before it is worn out because the public will always be making comparisons between the bus for which their patronage is solicited and the latest automobile. Such comparisons are more hurtful to the bus than to the street car, since the bus is primarily a vehicle which makes its appeal largely on the grounds of more luxurious and more direct service and on which a high fare should naturally and can properly be charged.

Just as the bus promoter overlooks the effect of the recent enormous increases in wages and underestimates depreciation and obsolescence, so does he err in estimates of bus mileage and bus earnings. One estimate calmly assumes a performance of 40,000 bus-miles per annum; yet the actual performance of the same type has under similar conditions in another city averaged only 27,000 miles. While we may grant that a bus can average or slightly exceed a schedule of 9 m.p.h., its over-all performance through the year will be less than that of electric cars for two reasons. First, the bus day is shorter because of the smaller amount of early morning traffic; second, the bus spends more time in the shop undergoing inspection and repairs. In view of the fact that 40,000 miles per annum is good electric car performance, we would hardly expect more than 30,000 to 32,000 miles from the more complex bus. So in this item alone, we see that the bus man expects to handle his business with but 80 per cent

of the buses he readily needs, and his first costs, buildings, etc., are affected in proportion.

But most misleading of all can be the estimates of traffic. It is easy to multiply the estimated mileage by the estimated passengers per mile and rate of fare, and come through with a triumphant 20 per cent return upon the investment. Analysis shows, however, that the optimistic promoter expects to build up in one year against competition as much business as other bus lines have built up in ten years with every condition of non-competition, short riding, dense population, etc., in their favor!

Far be it from us to decry the many ways in which buses can be made an adjunct to and a part of the popular transit facilities of a community. The bus has a place, though a limited one, in city transportation, as we pointed out editorially in the issue of Sept. 20. But the present plight of the street railway is overwhelming proof that utility to the public and profit to the investor are by no means one and the same thing. Therefore would we say to the man who is asked to go into a bus company: There is no more financial magic about gasoline than there has proved to be about electric transportation. Don't put a dollar into the bus until you are satisfied that every lesson of electric railway experience—such as unchangeable routes, rising costs, the need for a service-at-cost basis, etc.—has been taken into consideration.

Referendums Usually a Failure in Deciding Economic Questions

THE failure of the Denver electorate to indorse either of the two plans submitted at the election on Oct. 22 to settle the railway franchise question in that city leaves the situation as it was. Two plans suggested were designed to put the transportation system on a permanent basis, and both involved certain elements of service at cost, although one was known officially by that name and the other as the "elastic 6-cent fare plan." The referendum was preceded by an extended publicity campaign on the merits of each plan by citizen committees, while the company remained neutral, asking only for some reasonable and permanent settlement. Yet in spite of this campaign, only 40 per cent of the registered voters took the trouble to go to the polls. In the vote cast, the "service-at-cost franchise," recommended by the committee of fifty-five, lost by only 244 votes according to the returns, while the elastic 6-cent fare ordinance was defeated by a vote of 10,884 to 4,577.

The election in Denver illustrates again the weakness of the referendum for settling the economic questions of a municipality. Such matters, especially where they involve the question of justice to others, should not be determined by popular vote. In the first place, the average citizen will not take the time and trouble to give them the consideration they deserve or often even to vote. But even if he should attempt to study the question carefully and decide impartially he is after all an interested party, and it is a maxim in jurisprudence that no man should act as judge in a case in which he is interested. Our greatest wonder, therefore, is not that the franchise was defeated but that it came within 244 votes of being carried.

If, then, such questions should not be referred to popular vote, who is to decide them, and is not a denial of the referendum in cases of this kind an imputation against the fairness of the American voter? By no means. The question of a proper fare should be settled by an expert and an impartial commission, assisted in its determination of legal matters by the courts. When this is done, the public, like any other good litigant, will accept an adverse decision if it is satisfied with the fairness of the judges, and such willingness is just as good evidence of good citizenship and far more reasonable to expect than that the public will decide against itself in a question of how much it should pay for a necessary commodity or service.

St. Paul's Cascade Electrification Will Soon Be in Full Operation

OWING to the war there has been some delay in the completion of the plan of the Chicago, Milwaukee & St. Paul Railway for electrifying its Cascade Division. In a very few weeks now, however, the new passenger locomotives will be hauling the famous "Columbian" and "Olympian" across the Cascade Range, and the stored energy in these trains will be flowing back into the companies lines or even possibly into the transmission lines of the Washington Water Power Company as the trains go down the grade. When the new passenger locomotives have been delivered for the Rocky Mountain Division and the present high-speed locomotives on that division have been regeared for freight operation, the St. Paul Railway will have two splendid electric zones, separated by a short steam division of which the early electrification would seem to be inevitable. The steam division will be in a sense isolated, and from the standpoint of operating economy it will be necessary to electrify it. A stretch of more than 1000 miles of electrified track would certainly furnish a fine demonstration of the possibilities of heavy electric traction.

At a recent gathering of railroad men and others an operator high in the motive power department of one of our principal railroads said that some years back he had been prejudiced against electrification, but observation of the results secured from the St. Paul had entirely converted him, and he is now an enthusiast for it. May his tribe rapidly increase! Results such as those secured on this road, on the Norfolk & Western Railway and others are convincing the "doubting Thomases" that at least for surmounting ranges of mountains, electrification is the thing. To be sure, they insist on reminding us that contemporaneously with the improvement of the electric locomotive the steam locomotive development has not been slow. On fairly level track where there are no long tunnels, the competition between the two types of locomotive is bound to be increasingly keen. Mounting cost of coal, however, is going more and more to force conservation of this precious mineral. Electrification of all power-consuming devices is bound to come, and heavy traction is intimately tied in with this development. The approaching completion of the electrification of the western end of the St. Paul system is a milestone in the path of progress.

Protect the Car Storage Yard Adequately From Fire

THE fire hazard in an electric railway car storage yard is one worthy of even more serious consideration than it has received. We occasionally read of a holocaust, but there are many minor fires which receive no publicity but which in the aggregate cause the loss of much greatly needed equipment. As it is not uncommon to have rolling stock to the value of \$1,000,000 accumulated in one yard, the urgency of insuring suitable fire protection for this valuable equipment is obvious. The same principle applies in yards even where the possible loss is comparatively small.

Where conditions render it practicable, some such arrangement as that described by A. E. Harvey in an article appearing in the issue of this paper for Dec. 28, 1918, is highly desirable. In this article the writer explains why and how monitor towers were installed in a rearranged yard in Kansas City, so that any point in the yard could be reached without stringing hose across the tracks. In Mr. Harvey's yard the purpose in eliminating the hose was to obviate danger of interruption of the water supply by the cars which were being moved out of the danger zone. In the storage yards of lines which use third-rail there is an additional danger of electrical shock to firemen and others when hose is strung across the tracks. There are cases, however, where there are no fire hydrant connections of sufficient capacity in the immediate vicinity of a storage yard to permit the use of towers or hydrants, so that some other form of protection against fire must be resorted to.

An illustration of this last case was discussed in the issue of this paper for Oct. 18, namely, the practice of the Elevated Railways of Chicago, which has adopted cars equipped with chemical apparatus for the protection of yards not supplied with water. While these cars are not often called into service they have at times proved to be very effective means of protection. As the cars are not equipped with motors and control and were built by the company in its own shops, the investment cost was not large.

There is also very little maintenance expense, and the depreciation is practically negligible. The fact that the cars are not equipped with motors and control does not decrease their availability or flexibility, for whenever there are any cars lying idle in the yard one is always attached to a fire car. This motor will not be needed in service until all cars have been withdrawn from the yard, after which time there is no further use for the fire car.

These examples of recent progress in safeguarding equipment in the storage yard are cited simply by way of illustration of the general principle. While the insurance companies naturally exert all possible pressure on their policyholders to reduce fire hazard, it is a good thing for the electric railways themselves to exert their initiative in this direction. The question is not merely one of keeping down the danger of loss of property, but also one of preventing the possibility of the company being hampered in the giving of good service.

London's Tubes and Buses—II

Bus Time-table Practices—Zone Fare Auditing—Methods of Payment—Bonus Systems—Training, Welfare Work and Other Features Relative to Employees on London's Tubes and Buses

By WALTER JACKSON

IN VIEW of the importance of bus service to the transportation facilities of London, a few particulars about time-table practice may not be out of place.

Bus drivers and conductors formerly were paid on a mileage basis, the rates per mile varying according to the character of the route. Thus, "C," the highest rate, was for operation through congested districts; "B," the lowest rate, was for operation through districts where higher speeds are possible, and "A" was the intermediate rate. An addition to the rate is also made according to the record and seniority of the employee; also an extra payment of 1s. per hour is granted if the spread-over exceeds twelve hours. Layovers, therefore, do not enter into the calculations of wages paid. At the in-town end, layovers are only two or three minutes; at the outer end, they are somewhat longer, to average say ten to twelve minutes per round trip. Under a new agreement drivers and conductors are paid by the hour.

In general, the time-tables are prepared upon the basis of three crews for every two buses, namely, early, late and relief spells. On the table, buses which go out of the garage first have an odd number and those which are started an

The subdivision of spread-over time, etc., is tabulated at the bottom of the graph.

The schedule, previously shown, covered the work of the individual buses of a garage but did not designate the crews, the detail of their trips, their working periods, mileage made, spread-overs, etc. This character of data will be found on the "Drivers' and Conductors' Duty Schedule" reproduced. At the top of the table will be noted a tabulation of wages (under the old system) for drivers and conductors based upon classification "C," the intermediate group. Reference to the mileage column shows that ten-hour spreads give about 65 bus-miles and fourteen-hour spreads about 82 bus-miles. It is to be observed also that the wage calculation was prepared in advance.

In accordance with British practice, each bus carries a time-card, as illustrated, front and back. The front simply

Victoria & Seven Kings Service 25

	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th	18th	19th	20th	21st	22nd	23rd	24th	25th	26th	27th	28th	29th	30th	31st	32nd	33rd	34th	35th	36th	37th	38th	39th	40th	41st	42nd	43rd	44th	45th	46th	47th	48th	49th	50th	51st	52nd	53rd	54th	55th	56th	57th	58th	59th	60th	61st	62nd	63rd	64th	65th	66th	67th	68th	69th	70th	71st	72nd	73rd	74th	75th	76th	77th	78th	79th	80th	81st	82nd	83rd	84th	85th	86th	87th	88th	89th	90th	91st	92nd	93rd	94th	95th	96th	97th	98th	99th	100th	101st	102nd	103rd	104th	105th	106th	107th	108th	109th	110th	111th	112th	113th	114th	115th	116th	117th	118th	119th	120th	121st	122nd	123rd	124th	125th	126th	127th	128th	129th	130th	131st	132nd	133rd	134th	135th	136th	137th	138th	139th	140th	141st	142nd	143rd	144th	145th	146th	147th	148th	149th	150th	151st	152nd	153rd	154th	155th	156th	157th	158th	159th	160th	161st	162nd	163rd	164th	165th	166th	167th	168th	169th	170th	171st	172nd	173rd	174th	175th	176th	177th	178th	179th	180th	181st	182nd	183rd	184th	185th	186th	187th	188th	189th	190th	191st	192nd	193rd	194th	195th	196th	197th	198th	199th	200th	201st	202nd	203rd	204th	205th	206th	207th	208th	209th	210th	211st	212nd	213rd	214th	215th	216th	217th	218th	219th	220th	221st	222nd	223rd	224th	225th	226th	227th	228th	229th	230th	231st	232nd	233rd	234th	235th	236th	237th	238th	239th	240th	241st	242nd	243rd	244th	245th	246th	247th	248th	249th	250th	251st	252nd	253rd	254th	255th	256th	257th	258th	259th	260th	261st	262nd	263rd	264th	265th	266th	267th	268th	269th	270th	271st	272nd	273rd	274th	275th	276th	277th	278th	279th	280th	281st	282nd	283rd	284th	285th	286th	287th	288th	289th	290th	291st	292nd	293rd	294th	295th	296th	297th	298th	299th	300th	301st	302nd	303rd	304th	305th	306th	307th	308th	309th	310th	311st	312nd	313rd	314th	315th	316th	317th	318th	319th	320th	321st	322nd	323rd	324th	325th	326th	327th	328th	329th	330th	331st	332nd	333rd	334th	335th	336th	337th	338th	339th	340th	341st	342nd	343rd	344th	345th	346th	347th	348th	349th	350th	351st	352nd	353rd	354th	355th	356th	357th	358th	359th	360th	361st	362nd	363rd	364th	365th	366th	367th	368th	369th	370th	371st	372nd	373rd	374th	375th	376th	377th	378th	379th	380th	381st	382nd	383rd	384th	385th	386th	387th	388th	389th	390th	391st	392nd	393rd	394th	395th	396th	397th	398th	399th	400th	401st	402nd	403rd	404th	405th	406th	407th	408th	409th	410th	411st	412nd	413rd	414th	415th	416th	417th	418th	419th	420th	421st	422nd	423rd	424th	425th	426th	427th	428th	429th	430th	431st	432nd	433rd	434th	435th	436th	437th	438th	439th	440th	441st	442nd	443rd	444th	445th	446th	447th	448th	449th	450th	451st	452nd	453rd	454th	455th	456th	457th	458th	459th	460th	461st	462nd	463rd	464th	465th	466th	467th	468th	469th	470th	471st	472nd	473rd	474th	475th	476th	477th	478th	479th	480th	481st	482nd	483rd	484th	485th	486th	487th	488th	489th	490th	491st	492nd	493rd	494th	495th	496th	497th	498th	499th	500th	501st	502nd	503rd	504th	505th	506th	507th	508th	509th	510th	511st	512nd	513rd	514th	515th	516th	517th	518th	519th	520th	521st	522nd	523rd	524th	525th	526th	527th	528th	529th	530th	531st	532nd	533rd	534th	535th	536th	537th	538th	539th	540th	541st	542nd	543rd	544th	545th	546th	547th	548th	549th	550th	551st	552nd	553rd	554th	555th	556th	557th	558th	559th	560th	561st	562nd	563rd	564th	565th	566th	567th	568th	569th	570th	571st	572nd	573rd	574th	575th	576th	577th	578th	579th	580th	581st	582nd	583rd	584th	585th	586th	587th	588th	589th	590th	591st	592nd	593rd	594th	595th	596th	597th	598th	599th	600th	601st	602nd	603rd	604th	605th	606th	607th	608th	609th	610th	611st	612nd	613rd	614th	615th	616th	617th	618th	619th	620th	621st	622nd	623rd	624th	625th	626th	627th	628th	629th	630th	631st	632nd	633rd	634th	635th	636th	637th	638th	639th	640th	641st	642nd	643rd	644th	645th	646th	647th	648th	649th	650th	651st	652nd	653rd	654th	655th	656th	657th	658th	659th	660th	661st	662nd	663rd	664th	665th	666th	667th	668th	669th	670th	671st	672nd	673rd	674th	675th	676th	677th	678th	679th	680th	681st	682nd	683rd	684th	685th	686th	687th	688th	689th	690th	691st	692nd	693rd	694th	695th	696th	697th	698th	699th	700th	701st	702nd	703rd	704th	705th	706th	707th	708th	709th	710th	711st	712nd	713rd	714th	715th	716th	717th	718th	719th	720th	721st	722nd	723rd	724th	725th	726th	727th	728th	729th	730th	731st	732nd	733rd	734th	735th	736th	737th	738th	739th	740th	741st	742nd	743rd	744th	745th	746th	747th	748th	749th	750th	751st	752nd	753rd	754th	755th	756th	757th	758th	759th	760th	761st	762nd	763rd	764th	765th	766th	767th	768th	769th	770th	771st	772nd	773rd	774th	775th	776th	777th	778th	779th	780th	781st	782nd	783rd	784th	785th	786th	787th	788th	789th	790th	791st	792nd	793rd	794th	795th	796th	797th	798th	799th	800th	801st	802nd	803rd	804th	805th	806th	807th	808th	809th	810th	811st	812nd	813rd	814th	815th	816th	817th	818th	819th	820th	821st	822nd	823rd	824th	825th	826th	827th	828th	829th	830th	831st	832nd	833rd	834th	835th	836th	837th	838th	839th	840th	841st	842nd	843rd	844th	845th	846th	847th	848th	849th	850th	851st	852nd	853rd	854th	855th	856th	857th	858th	859th	860th	861st	862nd	863rd	864th	865th	866th	867th	868th	869th	870th	871st	872nd	873rd	874th	875th	876th	877th	878th	879th	880th	881st	882nd	883rd	884th	885th	886th	887th	888th	889th	890th	891st	892nd	893rd	894th	895th	896th	897th	898th	899th	900th	901st	902nd	903rd	904th	905th	906th	907th	908th	909th	910th	911st	912nd	913rd	914th	915th	916th	917th	918th	919th	920th	921st	922nd	923rd	924th	925th	926th	927th	928th	929th	930th	931st	932nd	933rd	934th	935th	936th	937th	938th	939th	940th	941st	942nd	943rd	944th	945th	946th	947th	948th	949th	950th	951st	952nd	953rd	954th	955th	956th	957th	958th	959th	960th	961st	962nd	963rd	964th	965th	966th	967th	968th	969th	970th	971st	972nd	973rd	974th	975th	976th	977th	978th	979th	980th	981st	982nd	983rd	984th	985th	986th	987th	988th	989th	990th	991st	992nd	993rd	994th	995th	996th	997th	998th	999th	1000th	1001st	1002nd	1003rd	1004th	1005th	1006th	1007th	1008th	1009th	1010th	1011st	1012nd	1013rd	1014th	1015th	1016th	1017th	1018th	1019th	1020th	1021st	1022nd	1023rd	1024th	1025th	1026th	1027th	1028th	1029th	1030th	1031st	1032nd	1033rd	1034th	1035th	1036th	1037th	1038th	1039th	1040th	1041st	1042nd	1043rd	1044th	1045th	1046th	1047th	1048th	1049th	1050th	1051st	1052nd	1053rd	1054th	1055th	1056th	1057th	1058th	1059th	1060th	1061st	1062nd	1063rd	1064th	1065th	1066th	1067th	1068th	1069th	1070th	1071st	1072nd	1073rd	1074th	1075th	1076th	1077th	1078th	1079th	1080th	1081st	1082nd	1083rd	1084th	1085th	1086th	1087th	1088th	1089th	1090th	1091st	1092nd	1093rd	1094th	1095th	1096th	1097th	1098th	1099th	1100th	1101st	1102nd	1103rd	1104th	1105th	1106th	1107th	1108th	1109th	1110th	1111st	1112nd	1113rd	1114th	1115th	1116th	1117th	1118th	1119th	1120th	1121st	1122nd	1123rd	1124th	1125th	1126th	1127th	1128th	1129th	1130th	1131st	1132nd	1133rd	1134th	1135th	1136th	1137th	1138th	1139th	1140th	1141st	1142nd	1143rd	1144th	1145th	1146th	1147th	1148th	1149th	1150th	1151st	1152nd	1153rd	1154th	1155th	1156th	1157th	1158th	1159th	1160th	1161st	1162nd	1163rd	1164th	1165th	1166th	1167th	1168th	1169th	1170th	1171st	1172nd	1173rd	1174th	1175th	1176th	1177th	1178th	1179th	1180th	1181st	1182nd	1183rd	1184th	1185th	1186th	1187th	1188th	1189th	1190th	1191st	1192nd	1193rd	1194th	1195th	1196th	1197th	1198th	1199th	1200th	1201st	1202nd	1203rd	1204th	1205th	1206th	1207th	1208th	1209th	1210th	1211st	1212nd	1213rd	1214th	1215th	1216th	1217th	1218th	1219th	1220th	1221st	1222nd	1223rd	1224th	1225th	1226th	1227th	1228th	1229th	1230th	1231st	1232nd	1233rd	1234th	1235th	1236th	1237th	1238th	1239th	1240th	1241st	1242nd	1243rd	1244th	1245th	1246th	1247th	1248th	1249th	1250th	1251st	1252nd	1253rd	1254th	1255th	1256th	1257th	1258th	1259th	1260th	1261st	1262nd	1263rd	1264th	1265th	1266th	1267th	1268th	1269th	1270th	1271st	1272nd	1273rd	1274th	1275th	1276th	1277th	1278th	1279th	1280th	1281st	1282nd	1283rd	1284th	1285th	1286th	1287th	1288th	1289th	1290th	1291st	1292nd	1293rd	1294th	1295th	1296th	1297th	1298th	1299th	1300th	1301st	1302nd	1303rd	1304th	1305th	1306th	1307th	1308th	1309th	1310th	1311st	1312nd	1313rd	1314th	1315th	1316th	1317th	1318th	1319th	1320th	1321st	1322nd	1323rd	1324th	1325th	1326th	1327th	1328th	1329th	1330th	1331st	1332nd	1333rd	1334th	1335th	1336th	1337th	1338th	1339th	1340th	134
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ROUTE *Finchley Park & Brondesley*
(Windsor Road Stn.) (Chen. Lk. Station)

DRIVERS' AND CONDUCTORS' DUTY SCHEDULE No. *49*

LONDON GENERAL OMNIBUS COMPANY, LIMITED.

COMMENCING *1st March* 1919 *Mon. to Sat. Day.* Service No. *4*

DIVISION *6*

DRIVERS *143 144 145 146 147*

CONDUCTORS *147 148 149 150 151*

No. of Omnibuses *10*

No. of Duties *15*

Garage *Kilbury*

System *Black*

TIME SCHEDULE No. *49*

RUTY NO.	STANDARD ROUTE NO.	DEPART GARAGE	FIRST SPELL		JOURNEYS	RELIEF	PERIOD OF RELIEF	SECOND SPELL		JOURNEYS	TOTALS	MILEAGE	TIME	AMOUNT	DRIVERS		CONDUCTORS		RUTY NO.	
			STARTING POINT	FINISHING POINT				STARTING POINT	FINISHING POINT						1st	2nd	3rd	4th		5th	6th
1	8	19	7	25	11	39	2 1/2	1	3	8	7	12	4	65	55	7	7	7	7	1
2	3	29	35	11	39	2 1/2	1	8	4	53	14	2	65	55	9	65	7	7	2	
3	5	40	46	11	39	2 1/2	1	8	4	53	14	2	65	55	9	65	7	7	3	
4	7	51	57	11	39	2 1/2	1	14	8	25	24	2	65	55	9	65	7	7	4	
5	9	8	8	11	39	2 1/2	1	14	8	25	24	2	65	55	9	65	7	7	5	
6	1	20	26	11	39	2 1/2	1	23	1	4	10	36	82	8	11	10	10	10	6	
7	4	31	37	11	39	2 1/2	1	3	1	3	50	56	12	8	11	10	10	10	7	
8	6	42	48	11	39	2 1/2	1	3	1	3	11	18	12	8	11	10	10	10	8	
9	7	53	59	11	39	2 1/2	1	3	1	3	11	18	12	8	11	10	10	10	9	
10	10	7	7	11	39	2 1/2	1	3	1	3	26	32	82	8	11	10	10	10	10	
11	1	11	11	11	39	2 1/2	1	1	5	1	36	42	81	65	11	10	10	10	11	
12	3	48	54	11	39	2 1/2	1	1	12	4	50	56	81	65	11	10	10	10	12	
13	5	12	12	11	39	2 1/2	1	1	12	4	10	16	65	55	10	6	7	7	13	
14	7	12	12	11	39	2 1/2	1	1	12	4	10	16	65	55	10	6	7	7	14	
15	9	20	26	11	39	2 1/2	1	1	12	4	10	16	65	55	10	6	7	7	15	

A JOURNEY *16* MILES *Finchley Park & Brondesley*

B Do. *20* Do. *Windsor Road*

C Do. Do. Do.

D Do. Do. Do.

E Do. Do. Do.

X Do. *NIL* Do. GARAGE to

TOTAL JOURNEYS *710*

TOTAL DUTY MILEAGE *1101 7*

NO. OF RUTS	DRIVERS	A.	B.	C.	D.	E.	X.	TOTAL
7	1-9	14	7	1				115 0
3	6-8	10	6	1				99 7
TOTAL								1101 7

DRIVERS' AND CONDUCTORS' DUTY SCHEDULE

to find ways and means of simplifying the ticket and reducing its cost. Here, too, as in other affairs, the spur of war necessity accelerated improvement. The order had gone forth to save paper, and save paper the company did. Tickets that were 4 to 5 in. long because they showed all the stages over a given route were shortened to 2½ in. by "splitting" the ticket, namely, issuing say a 1d. ticket for one-half the route and a second 1d. ticket on which the stages of the remaining half were shown. Of course as the denomination of a ticket rises, its stages cover greater distances and are therefore fewer in number. Hence, tickets from 4d. up are only 2½ in. x 1½ in. and the cheapest tickets now do not exceed 3¼-in. length by 1½-in. width. All but the most popular or penny tickets are colored, and the price appears both in small black type and large red surprint. The higher rates are due to the long runs into the country. In fact, on a route like Golder's Green-St. Albans, the long-distance riders exceed the short riders, since the run is through open country in competition with the railways. Several tickets are reproduced on page 818.

In addition to the letter and serial numbering of the tickets, it is essential to make a further subdivision according to routes or "services." The service numbers are printed at the side of the tickets in some cases and at the top in others, according to space conditions. The ticket is also identifiable by the names of the stages on the particular route. For use in emergencies, there are printed at the bottom of the tickets a number of letters. These letters serve several purposes, such as for indicating rides between stages that have just been established and which will appear on the new ticket when the old type is exhausted; or they may be used for indicating rides between the stages temporarily established for the long pleasure rides, for sudden changes in the lengths of ride for a given fare, for special runs out of certain garages, etc. On the higher-priced tickets, these emergency letters embrace the entire alphabet, thereby giving these tickets great flexibility. Numbers are also used for emergency conditions, but not to show standard stages.

In standard tramway practice, it is customary for the

LONDON GENERAL OMNIBUS COMPANY, LIMITED.

Victoria & Seven Kings

AP1

5K	U	U	5K
5 44	7 15	7 17	8 48
9 3	10 43	10 45	12 25
12 45	2 25	2 27	4 7
4 25	6 5	6 7	7 47

Monday to Friday

Aug 5th 1918

Conductor

Point to Point Time Card for Service No. 25:

VICTORIA STATION and SEVEN KINGS.

WEEKDAYS.

POINTS.	Before 9 a.m.	9 a.m. to 7.30 p.m.		After 7.30 p.m.
		Sets. only 9 a.m. to 3 p.m.	Sets. only after 3 p.m.	
Victoria	4	5	5	
& Hyde Park Corner	4	5	5	
Hyde Park Corner	10	12	11	
Oxford Circus	4	4	4	
Tottenham Ct. Rd.	5	6	6	
Chancery Lane	8	11	9	
Bank	5	6	5	
Aldgate Station	7	8	7	
Mile End Gate	6	6	6	
Burdett Road	6	6	6	
Bow Bridge	7	7	7	
Stratford Broadway	7	7	7	
Princess Alice	6	6	6	
Manor Park Bdw.	7	7	7	
Ilford Broadway	9	9	9	
Seven Kings				

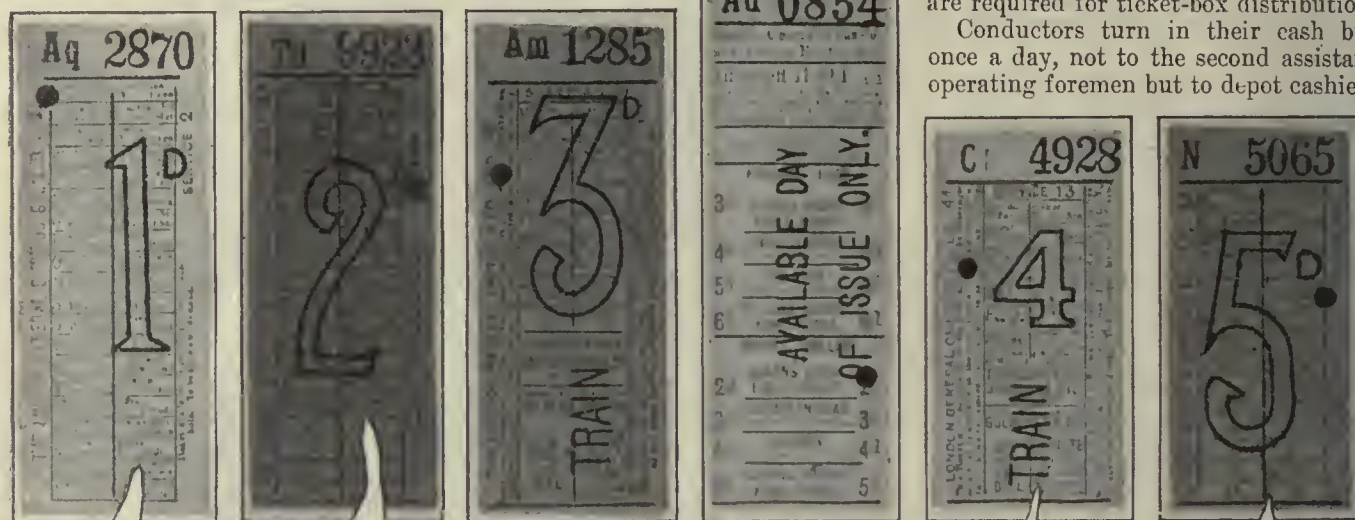
91 . 100 - 95

BOTH SIDES OF TIME-POINT CARD CARRIED IN BUS

conductor to punch the destination stage. On the London General Omnibus tickets, however, the stages are so arranged that the punch mark shows both the entrance stage and, directly opposite, the destination stage.

For through booking with the Underground Electric Railways, the duplex type of ticket is being superseded by a single ticket of the general bus design in order to save work for the conductors. When a bus passenger buys such a ticket, it is punched in the entrance section as usual. On alighting at the underground station indicated on the ticket, he presents the ticket for a second punching which cancels it against reuse. He gives up the ticket on completing the underground ride exactly like any other subway rider. It should be added that the ticket also shows the names of the farthest stations to which he is entitled to ride, as for example: "Passengers change at Finsbury Park for Kings Cross (or) Russell Square, Holborn."

Passengers who book from the underground lines to the bus lines purchase a two-part ticket as will be described in a later article on underground railway tickets.



SPECIMENS OF LONDON BUS TICKETS

The tickets are supplied by the Bell Punch & Ticket Company of London. The lower rate tickets are stocked for six to eight weeks ahead and the higher rate tickets for longer periods. Advertising on the back of tickets is handled directly by the ticket printer.

TICKET CHECK WITHOUT AND WITHIN

It is obvious that in a city like London the enormous fluctuations in traffic and the large number of employees demand a greater proportion of supervisory personnel than in smaller cities where traffic changes are less violent and where there is a closer relationship between the platform employees and the management. This fact must be taken into account when it is stated that there are 650 inspectors for 3400 conductors.

However, only 30 per cent of the time of inspectors is charged against the ticket check account. These men begin the day's work as timekeepers at terminal points, and even during the hours when they are "jumping the buses" their duties cover the whole range of time and traffic supervision. In fact, sixty-nine so-called inspectors are women who are engaged exclusively as timekeepers. If due allowance is made for this, it will be found that the number of outside inspectors is 581 and that 30 per cent of their time is equivalent to the employment of 174 full-time ticket inspectors. These men board the buses at irregular intervals, examine the conductor's tickets and waybills to get the serial numbers, then visé the tickets of the passengers and finally initial the waybill as an indication of their in-

spection. Part of the inspectors constitute a flying squad for the intensive inspection of routes which appear to require it. In one week early in 1919 there were 10,930 ticket inspections on the entire system at a time when 198 men were on full time and 1439 men on part-time ticket checking.

The usual punch and ticket boxes supplied to conductors on graduated fare systems are furnished on this undertaking through garage clerks who are listed as "second assistant operating foremen." There are about twenty-five of these men. Their time is charged against the item "Running of depot staff" and not against the ticket system since the issuance of ticket boxes is no greater burden than handing out transfer pads to conductors in an American carhouse.

The tickets are put up in advance by the ticket department according to the estimated needs of each conductor. While one box is out in service another is being replenished. The boxes bear the usual identification of conductor's number, route number and station (garage) number. Five motor lorries are required for ticket-box distribution.

Conductors turn in their cash but once a day, not to the second assistant operating foremen but to depot cashiers

who receipt therefor by signing the conductor's cash total sheet where designated, in red ink. The cashiers bank the money locally and forward the receipts for their deposits to the head cashier.

This cash total sheet is a record of the conductor's financial operations only. It is entirely independent of his trip sheet or waybill which is prepared for the transportation department. It is on the cash total sheet, which accompanies his box, that the ticket department makes the customary entries of tickets issued, etc., as shown on the form itself. Each cash total sheet is copied into a book record before it goes out with its box.

Of all the undertakings visited, none appears to go into the matter of ticket check to so great a degree of refinement. As the tickets taken from stock are entered on the cash total sheet and placed in the box, they are counterchecked fare for fare by a second girl instead of depending upon one clerk alone. In accordance with the usual practice, each conductor's supply comes from one bin so that the cheaper tickets at least are furnished to him in serial order. Although a conductor must always work off his own remainders these remainders are carefully inspected to see that no intermediate tickets have been withdrawn or lost. This check is especially important on the bus system because of the fact that the fares run up to such high denominations. It is quite possible, also, for the bottom ticket of a pad to drop off, in which event the conductor must turn in a special lost ticket memorandum if he wants the debit against him wiped out.

Following the ticket check, the register reading is tallied against the ticket total. As one girl calls out the number shown on the punch, her mate responds with the total shown on the cash total sheet. Ordinarily, the punchings are counted only in the case of discrepancies, no matter how small these may be, but if a conductor is under suspicion the punchings will be counted even if there are no apparent discrepancies. Due to these refinements something like 500 to 550 counts out of 3000 punches are made every day. After the punches have been opened and inspected, they are reset to zero and sealed for reissue.

The last step in the handling of the box returns is to convert all ticket values to pennies as a tally against the cash statement. These extensions are made without the help of calculating machines except following a holiday, when the work is doubled. The machines are comptometers and are borrowed from the comptometer department which is referred to in the next paragraph.

The purpose of the comptometer department is to derive from the cash total sheets such traffic data as the daily, weekly and monthly earnings of the individual routes according to the denominations of tickets sold. Incidentally, the calculations of the comptometer department serve to check the count of the ticket department against the cash earning sheets forwarded by the garage cashiers. The individual service or route statements of the comptometer department also includes the totalized shorts and overs. The garage cashiers restore overs to the individual conductors only upon the order of the chief cashier, following the movement of the conductors' cash total sheets through the ticket department and the counter-checking comptometer department.

For the handling of 2,000,000 tickets a day, the auditing and cash return of 3,000 conductors' cash total sheets and the posting of traffic and different classes of ticket sales on more than 100 routes, the following central office personnel was required as of March 10, 1919:

General clerical staff.....	16
Forewomen	5
Assistants to forewomen.....	3
Cash and register clerks.....	17
Punch clerks	17
Ticket clerks	79
Messroom staff (meals furnished on premises).....	4
Porters (male)	9
Comptometer operators	8
Total	158



INSPECTOR CHECKING TICKETS OF WOMAN CONDUCTOR

The general American impression that Britons are physically deliberate would be quickly dispelled by observing the flying leaps to and from buses taken by both sexes and all ages of London's population. No marvel then that the London General Omnibus Company and its associated companies had to anticipate the wider campaign which the London Safety First Council has been carrying on for two years. The organization of this council of transportation companies, large employers, etc., along our

own lines of co-operative safety work has, however, the merit of getting a better and wider hearing from the public than could the best possible campaign of individual concerns.

Two plans are used by the L. G. O. to enlist the co-operation of its employees; one is to reward the individual and the other is to maintain a spirit of emulation among the forces of the twenty-three garages. The conductors who have been free from accident receive 1d. a day bonus payable quarterly. The drivers receive not only this bonus but another 2s. 6d. to 15s. quarterly depending upon their number of working days and whether they had one, two, three or more mishaps during the period. For the quarter ended September, 1918, the total accident bonus amounted to £2,466 of which £482 was the penny-a-day increment for conductors.

In the case of garage competition, a safety first shield is displayed by the garage which can show the least number of accidents per 10,000 miles every calendar year. For the year 1917-1918 the rating was shown pictorially by a party of mountaineers, each climber representing the relative position of a garage. Those garages which fell back a bit

THE LONDON GENERAL OMNIBUS Co., Ltd.—Cash Total Sheet.											
Service No.		Duty No.				Punch No.					
Date	Time of Day	Quantity Issued	Letter	Numbers	Quantity Returned	Letter	Numbers	TOTAL SOLD.	FROM PREVIOUS DAY	£	s. d.
1d.	1st No. at Start of Day							1d.			
1d.	2nd No. at Start of Day							1d.			
2d.	3rd No. at Start of Day							2d.			
3d.	4th No. at Start of Day							3d.			
9d.	5th No. at Start of Day							9d.			
10d.	6th No. at Start of Day							10d.			
11d.	7th No. at Start of Day							11d.			
12d.	8th No. at Start of Day							12d.			
Cash paid in - £		TOTAL NUMBER OF TICKETS SOLD ..						£			
Coupons collected ..		Conductor's Signature ..				Badge No.		FOR OFFICE USE ONLY.			
TOTAL ..		Cashier's Signature ..						Total ..			
TOTAL AMOUNT PAID IN £								Over ..			
								Short ..			

CONDUCTOR'S CASH TOTAL SHEET

TOTAL NUMBER OF FARE TICKETS SOLD ..											
TWO-JOURNEY EXCHANGE TICKETS.		Quantity Issued	Letter	Numbers	Quantity Returned	Letter	Numbers				
1st No. at Start of Day											
2nd No. at Start of Day											
Quantity Sold											
RAILWAY EXCHANGE TICKETS.		1st No. at Start of Day									
2nd No. at Start of Day											
Quantity Sold											
BLACKWALL TUNNEL EXCHANGE TICKETS.		1st No. at Start of Day									
2nd No. at Start of Day											
Quantity Sold											
Total.		Total.		Total.		Total.					
NUMBER OF TWO-JOURNEY TICKETS RECEIVED.		NUMBER OF RAILWAY TICKETS RECEIVED.		NUMBER OF 2nd HALVES OF BLACKWALL TUNNEL TICKETS RECEIVED.							
REMARKS.								GRAND TOTAL			
								PUNCH REGISTER			
								OVER ..			
								SHORT ..			
The Conductor will be held responsible for every Ticket issued to him, and any not sold or returned will be charged for. The Punch and the remaining Tickets must be returned to the Tin Box to the Office. Keep the Ticket Box in the cupboard and the cupboard locked. This Bill to be handed to the Cashier with the money. All Tickets issued in error to passengers must be reported as a special report form addressed to Ticket Superintendent. Conductors must clearly state name and address of passenger and return report in his Tin Box.											

CONDUCTOR'S CLASSIFICATION OF TICKET SALES

compared with last year are shown out of the perpendicular on the cartoon. In the preceding year, the relative performances were shown by means of the old-time sledgehammer and scale, as also reproduced.

Unfortunately, it is impossible to reproduce satisfactorily the most interesting stimulator of all, namely, the race course. At each garage there is mounted a model of a race course comprising an inner ellipse for the order of merit in the preceding year and an outer ellipse for the order of merit during the current year. Each "horse" is a wooden oval bearing the name of a garage and is placed in the same relative position as the order of merit in freedom from accidents for every 10,000 miles operated. The outer course is brought up to date every month. The best garage showed in 1918 a record of only 0.99 accident per 10,000 miles—a most remarkable achievement at any time, but all the more creditable because it was made during a year when lighting restrictions were still in force and in a city whose fogs are proverbial for density and frequency. Furthermore, it should be stated that the word "accident" includes even such trifling mishaps as a broken window.

In addition to the usual warning signs placed on the buses, the company's appeal to the public includes a variety of cartoons and posters issued independently and many like publications issued in co-operation with the London Safety First Council. Among the latter are the two posters "Tips and Cues for Pedestrians" and "Look Around Before Crossing," shown in accompanying illustrations.

Returning to the matter of emulation between garages, it may be added that an efficiency shield is displayed by that garage which during the preceding year ran the great-

est number of consecutive days without loss of mileage. Further, the order of efficiency in the consumption of petrol in miles per gallon is posted on boards on a week to week basis.

Photographs of drivers, male and female, taken outside the Mansion House last April to receive "Freedom from Accident" competition badge and award of the London Safety First Council are shown in accompanying views.

CO-OPERATION BETWEEN COMPANY AND EMPLOYEES

The following are some other methods employed by the company in securing the co-operation of the staff, stimulating their interest and encouraging them to develop resource and initiative:

(a) Suggestion Scheme

Suggestions are invited from all members of the staff on every aspect of the work, and awards are made if the suggestion is approved. During 1917 and 1918, 1,000 suggestions were received from the staff and awards made number 230. The minimum award is 10s., as high a figure, however, as £50 has been paid for a suggestion.

(b) Lost Mileage, Accidents

The men at the garages are encouraged to discuss with the foreman matters relating to lost mileage, accidents, etc. Two views on page 822 show a group of men looking at the daily Running Record, the figures of which have just been chalked in by the foreman, and details of the record board.

These figures for all garages are compared from time to time, and there is keen competitive interest as to the num-

[Poster No. 5.]



LONDON SAFETY FIRST COUNCIL

"TIPS" AND "CUES" FOR PEDESTRIANS.

An accurately turned Billiard Ball will always

Look Round

S Don't turn your back to the traffic when crossing a street. Face it, and A Don't dodge behind the vehicle from which you have just alighted. Make first for the kerb and— F Don't dart straight across a road, but let your course be "V" shaped. Run first to the right, then to the left. By this method, the traffic is always faced. At the same time— E Don't fail to use refuges wherever available. These are found at most busy crossing places, and justify an estimate of your journey to use them. In any case— T Don't cross a street at a point where a side street intersects. Make sure you are safe from the traffic in both main and side streets and subvertically like the Billiard Ball. Y Don't attempt to squeeze your way through a block in the traffic. The vehicles may commence to move, and you would then run the risk of being crushed. Always— F Don't omit to keep a sharp look-out for on-coming traffic. Before stepping off the kerb— I Don't fail to take special care at night time. Cross over a lamp. Collect your thoughts, and— R Don't attempt to board, or alight from, a vehicle until you are certain the road is clear. Steady your nerves, adjust your parcels and— S Don't neglect to look both ways before crossing a road. In other words— T Don't fail to warn other pedestrians who may be walking into danger. They may be short-sighted, deaf, or absent-minded. Signal to them to— Don't forget that an essential principle of "Safety First" is to <i>Look Round</i>	L O O K R O U N D
--	---

"Safety First" is a trade mark of the London Safety First Council. It is a principle of the London Safety First Council. It is a principle of the London Safety First Council.

BILLIARD LANGUAGE APPLIED TO ACCIDENT PREVENTION

LONDON

"SAFETY FIRST"

COUNCIL



"SAFETY FIRST"

"LOOK AROUND BEFORE CROSSING"



Issued by the LONDON SAFETY FIRST COUNCIL, 35 WESTMINSTER BROADWAY, LONDON, S.W. 1

A DANGER WARNING IN BLACK AND WHITE

ber of days which can be run without any miles being lost. Frequently the garages have run 200 days without losing any miles at all, which is a remarkable record considering the surface condition of the routes, during the war the maintenance of which had been set back.

(c) Efficiency Meetings

Efficiency meetings are held during the winter in the company's cinema hall at the training school, Chelsea. Between 300 and 400 of the control and inspecting staffs attend. Papers are read, followed by open discussion. These meetings have been held during the last four winters and the fifth series was begun in October, 1919. The following subjects were taken at the series of 1918-1919:

1. Cinema lecture "Some Topical Cinema Productions in Connection with the Underground Railways and L. G. O. Co."
2. Bus maintenance.
3. "Problems of My Official Life." (Seven short papers.)
4. "A Day in a Traffic Controller's Office." (Three papers by the three traffic controllers.)
5. Railway maintenance—civil engineering.
6. "Safety First"—the progress and possibilities of accident prevention work.

(d) Records of Staff

Individual attention is devoted to the records of service of the staff and entries are made thereon for special merit. Commendation received from the public is also carefully noted, and frequently the men are brought to the chief office for personal commendation by a higher official.

The Omnibus Athletic Club has a membership of over 1,000 and includes cricket, football, tennis, swimming, dances, whist drives, concerts, summer outings. A horticultural society was formed in 1918 and has a membership of 500.

Two shows have already been held, the entries numbering 500 produce exhibits and 100 rabbits. The rifle club, with a membership of 400, is a flourishing phase of the athletic side. Seven ranges in various parts of London are provided and keen interest is taken in the competitions and matches arranged internally and with outside clubs. The company has fifteen billiard rooms and facilities for other indoor games. A photograph of one of the billiard rooms is reproduced.

The Athletic & Social Institution issues monthly its *Athletic & Social News*, 10,000 copies of which are distributed among the staff.

SPECIAL CONSTABULARY

In 1914, a division of the Metropolitan Special Constabulary of London was formed, known as the "L. G. O. C. Division," consisting of 450 of the staff, all of whom were obliged to pass a proficiency drill examination. Their duties were mainly allocated to the protection of the company's property and of the public during the air raids. A detachment of fifty of the corps stood by at the company's chief office every night during 1917 and 1918 to take duty at a moment's warning. In addition to this, the remainder of the corps were available on all occasions of air raids, and, with the use of the company's omnibuses, were sent to the various points of London to control the street crowds



THE ANNUAL CLIMB FOR THE "SAFETY FIRST" GARAGE SHIELD



HAMMERING AT ACCIDENT PREVENTION IS A FAVORITE OCCUPATION



LIGHTLESS NIGHTS AND RUTFUL ROADS DID NOT PREVENT THESE BUS DRIVERS FROM RUNNING ACCIDENT FREE

during the time of air raids. They have also been called out for duty on occasions of processions, and the following is an extract of a letter received from the chief staff officer:

I take advantage of the approaching official visit of the Inspector-General of Divisions to the L. G. O. C. Detachment of the Metropolitan Special Constabulary to express to the commander, his officers and men, my high appreciation of the valuable public service they have always given in the force.

Every duty assigned to the detachment has been performed promptly, regularly and well, and I acknowledge with sincere thanks the time, effort and other contributions to the service.

However exacting the duty, it has always been done with the utmost cheerfulness and good will.

It is with very great pleasure that I congratulate the commander and all ranks serving under him upon the high parade efficiency of the L. G. O. Detachment.

OPERATING DEPARTMENT'S TRAINING SCHOOL (FROM AN L. G. O. SOUVENIR BOOKLET)

The training school and employment bureau of the London General Omnibus Company, Limited, is situated in Chelsea, S. W. The area site occupies some 31,050 sq. ft., 5,396 of which comprise an open yard, in which various hazards, such as dummy refugees, pedestals, etc., are placed, in connection with the training of drivers to avoid such obstacles, to reverse, etc.

The buildings comprise:

(a) Five class rooms, in which lectures are given. In the drivers' rooms, various parts of the bus chassis and an actual section through one of the engines are exhibited, so that

learners may obtain a knowledge of the mechanical equipment and then be able to remedy small breakdown defects without having to send for assistance;

In the conductors' rooms, operation of the punch and tickets is taught, the fare stages explained and other parts of their duty discussed;

(b) The cinema hall, with seating accommodation for 400, where educational films of their work are shown to the men and women in training, actual conditions of service working points in connection with avoidance of accidents, etc., being clearly discussed during the lectures;

(c) A mess room for the provision of food at practically cost price to learners;

(d) Small covered yard;

(e) Office accommodation;

(f) Photography section;

Adjoining the actual training school premises, are:

(g) Chemical laboratory;

(h) The clothing store, the headquarters of the clothing department, which is also under the control of the superintendent of employment, a competent tailor being in charge of the section, assisted by a staff of six storekeepers, clerks and tailor-esses. All uniform clothing necessary for the company's 10,000 drivers, conductors and inspectors is dealt with here, both in regard to receipt, storage, issue and record.

The tailor's shop is fitted with staff and machines for dealing with minor alterations to garments. The meas-



"WHEN CONSTABULARY DUTY'S TO BE DONE, TO BE DONE," THESE L. G. O. MEN MAKE GOOD

urements of the staff have been co-ordinated into twenty stock sizes, thus doing away with the difficulties of individual measurement of so large a number. This has been of material assistance in cost, delivery and speed in fitting.

As many as 600 men have been supplied and fitted with well-tailored suits in one day, and out of a total issue to



EXAMINING COMPARISONS OF LOST MILEAGE AND EFFICIENCY IN FUEL USE, AND A CLOSE-UP OF THE EFFICIENCY RECORD BOARD

THE LONDON GENERAL OMNIBUS COMPANY LTD.			
HAMMERSMITH GARAGE			
RUNNING RECORD			
FOR 15 th March 1916		LAST WEEK'S FIRST AND SECOND	
ACCIDENTS	NIL	1	2
LOST MILES	NIL	NIL	NIL
INVOLUNTARY STOPS	NIL	1	
6 BEST & 6 WORST CARS ON PETROL CONSUMPTION			
6 BEST		6 WORST	
L 23	23	L 21	21
24	24	22	22
25	25	23	23
26	26	24	24
27	27	25	25
28	28	26	26
29	29	27	27
30	30	28	28
		29	29
		30	30
		31	31
		32	32
		33	33
		34	34
		35	35
		36	36
		37	37
		38	38
		39	39
		40	40
		41	41
		42	42
		43	43
		44	44
		45	45
		46	46
		47	47
		48	48
		49	49
		50	50
		51	51
		52	52
		53	53
		54	54
		55	55
		56	56
		57	57



NOR ARE GOOD LOOKS A BAR TOWARD WINNING MEDALS AS CAREFUL DRIVERS DESPITE AIR RAIDS APLENTY

the 10,000 men and women concerned, only twenty remained which required alteration.

The office accommodation includes the headquarters arrangements of the twenty-three mess rooms and institutes, which have been established in connection either with the garages or terminal points in different parts of London, where the employees have special arrangements made to enable them to purchase refreshments at practically cost price, the company bearing the expense of accommodation, lighting, etc. About 3,800,000 purchases were made by the employees during 1917.

TRAINING OF DRIVERS

The following is an outline of the procedure in connection with the engaging and training of drivers:

The company does not accept new drivers for employment under twenty-five years of age, or over forty-five, and the minimum height measurement is 5 ft. 6 in. The medical examination is strict, particularly in regard to sight and hearing, and men who find it necessary to use spectacles are not accepted. The services of the most capable and experienced drivers in the employ of the company are utilized as instructors, and these, with special learners' buses, are attached to the various garages.

After men have been accepted for tuition, they are allocated to garages as near as possible to their homes, and are put through the first stages of their training at the training school, where, contemporaneously with lectures, practical lessons are given in gear changing and general control of the vehicle.

Driving instruction is first given on the school premises, and, subsequently, in quiet neighborhoods, where there is little or no traffic. Subject to satisfactory progress, learners

are then taken into streets carrying heavier traffic. After being finally tested by one of the chief instructors, they submit to the Scotland Yard police test, which includes an examination in a short arm reverse and actual driving through the busiest West End thoroughfares.

The average time taken to train a driver to become fully competent is twenty-eight days.

TRAINING OF CONDUCTORS

Conductors are not employed under twenty years of age, or less than 5 ft. in height, this minimum height being fixed by the police. No man or woman is accepted for employment unless he or she is physically sound in all respects, but the medical test is not so severe as in the case of drivers. Learners are required to attend at the training school to hear lectures on tickets, avoidance of accidents, and on general traffic work, and to see the cinematograph films. They are allocated to garages and begin their service work with an experienced conductor, in order to obtain practice in the use of the punch, tickets, handling of cash and the general duties of a conductor in actual service conditions. The average time taken to train as conductor is fourteen days.

Learners, both drivers and conductors, receive a food allowance while under tuition, this being for a maximum period of twenty-eight days with drivers and fourteen days with conductors.

INSPECTOR OUTPUT OF SCHOOL

Inspectors are promoted from the staff and attend at the training school for instruction and examination in regard to their new and more important duties, particularly in connection with dealing with the public and the staff, and a knowledge of traffic observation.

The following are the numbers of men and women passed out from the training school for service with the company:

	Drivers		Conductors	Inspectors
	New	On duplicate types of bus.		
To Dec. 31, 1913.....	4	84	...	1
Year ending Dec. 31, 1914..	1,149	994	528	91
Year ending Dec. 31, 1915..	650	278	521	83
Year ending Dec. 31, 1916..	74	87	1,922	127
Year ending Dec. 31, 1917..	44	53	1,717	106
			Male	Female
Year ending Dec. 31, 1918..	251	19	410	1,245
To date, 1919.....	659	161	894	...

Publicity Men Get Definite Organization

PRESIDENT PARDEE of the American Electric Railway Association has appointed the members of the executive board of the publicity men as elected at the Atlantic City convention, to be the members of a permanent standing committee of the parent association. This gives the publicity men a definite organization through which they can proceed to work out an instrumentality for the compilation and dissemination of data and information in a manner to amplify the value of the publicity men's work to the industry. Leake Carraway, Virginia Railway & Power Company, is chairman and the other members of the committee are E. R. Kelsay, Luke Grant, W. P. Strandborg and A. D. B. Van Zant.

A meeting of this committee of five men has been called by the chairman for Nov. 15 in the association office in New York for the purpose of laying plans for future activities. Then it is planned to have a meeting of the "committee of the whole," that is, of all publicity men, at the time and place of the mid-year meeting of the American Association. It is desired that all publicity men connected with the industry take membership in the committee of the whole and lend their support to the development of a system for the interchange of ideas and data.



THEY PLAY REAL BILLIARDS ON MAX-SIZE TABLES IN LONDON

Utilities Commissioners Discuss Railway Problem

Thirty-first Annual Convention Hears Many Committee Reports, Some of Which Are of Interest to Railway Men and Are Here Abstracted

THE thirty-first annual convention of the National Association of Railway and Utilities Commissioners, of which Charles E. Elmquist, of Minnesota, was president, was held in Indianapolis from Oct. 14 to 17. The convention was addressed in its opening session by President Elmquist and by Governor Goodrich of Indiana. At the close of his address, the president announced his resignation as a solicitor of the association and his intention to return to law practice in St. Paul. The closing session elected Walter A. Shaw of Illinois president of the association and James B. Walker of New York secretary for another term.

Of the twelve standing committees, six did not make any report. Abstracts of those made, which are of interest in the electric railway field, are presented herewith:

REPORT OF THE COMMITTEE ON PUBLIC OWNERSHIP AND OPERATION

The movement toward public ownership and operation has received succor from a wide variety of sources. The argument that the public should hold in its name the fee and title of those activities which serve the public and which the public regulates is an argument which many people accept as the last word on the subject. The argument that the public can do as it pleases with that which is its very own is in many quarters equally conclusive. One of the arguments that is seldom used, and never can be truthfully used, is that public ownership and operation is more efficient than private ownership and private operation. Instances do exist where a well-managed publicly-owned property is more efficient than a poorly-managed privately-owned property, but these are rare and do not in any way weaken the statement that the final desideratum in a public property is that degree of efficiency which is being obtained under private ownership and operation.

There has been considerably more agitation for public ownership during the past few years than ever before. The underlying reasons are many, and may perhaps all be traced back to the war and the conditions growing out of it. Local utilities have been affected fully as much as railroads and wire lines. The reasons for the impetus given to the movement for public ownership and operation may briefly be summarized as follows:

1. *The propaganda started by the governmental control of wire lines and railroads.* It was but natural that once the bigger utilities were taken over by the government, the movement should be reflected in the effort to municipalize water, gas and electric utilities.

2. *The failure of utility managements to meet the increased demands upon them.* This refers as much to service, depleted and depreciated, as to rates. It was, no uncommon thing to find a gas or electric company, or even a water utility, unable to cope with the situations which arose, and too often the managements were prone to charge their own shortcomings against the regulatory body which had control over them. Inefficiencies in plant operation were brought to light which the general public never knew existed.

3. *The failure of regulatory bodies, either state or local, to sense the seriousness of the situations and to give utilities the needed assistance in time to avert disaster.* This is not meant as a reflection upon any commission, nor upon its policies, but the fact is that in the flood of applications

for increases in rates which were necessary to keep utilities alive a regulatory body was not able to discriminate as it should.

4. *The inherent thought with many people that public ownership and operation is a panacea for all ills.* So without thought or examination of the possible effect, with the propaganda praise of it ringing in our ears, many people became adherents of, and shouters for, public ownership.

5. *Increased rates have had a great effect.* In the case of street railways, especially, people have come to believe that a municipally-owned transportation system would be able to continue to give the people a low fare. In many cases the companies have asked to be relieved of their paving obligation or some measure of taxes in order to be able to continue a 5-cent fare. These requests have led people to believe that were the system municipally owned the fares would continue low.

There has been considerable legislation enacted, and still more introduced, which tends to make the process of municipalization or public ownership easier. New Jersey, California, Montana, Nebraska, Washington, Oregon, Nevada, Wyoming, Iowa and Wisconsin have all passed such laws. In Pennsylvania, Governor Sproul vetoed a bill which granted municipalities the right to own and operate street railways beyond their municipal limits. In New York, Governor Smith vetoed a measure authorizing the city of Buffalo and the International Railway Company to enter into a contract providing for the operation of the street railroads in the city of Buffalo.

This report cannot attempt to go into all or even part of the proposed legislation. Suffice it to say that the tendency toward ownership or a supervision which cannot differentiate between regulation and management has been marked. While the figures obtainable show little or no increase in the number of utilities municipalized, and for some utilities a decrease is shown, there is no question but that there is a quite decided awakening of public interest in the matter. Whether this public interest is a flurry as a result of unsettled economic conditions only time can tell.

There is another phase of the public ownership question which we have but mentioned, and which is probably the most prominent of the whole situation. Municipalities must have transportation systems. The financial status of the great majority of urban railways has become such that they have been unable to make extensions or to better the service they are rendering. And the increase of fare does not always wholly alleviate the situation. The people dependent upon the street railways are those least able to pay an increased fare. The constantly mounting cost of living and the consequent raising of wages affect the street railway systems more than other utilities, because between 40 per cent and 50 per cent of the operating expenses of street railways are the labor costs.

The President deemed the situation serious enough to appoint a commission to investigate the subject and make recommendations. For some months now this commission has been hearing evidence from all sides,—from the operators, the bankers, the mayors of communities served, and from labor. No recommendations have yet been made. But the hearings developed that the street railway problem was of utmost importance. Communities now realize it, although heretofore they have been prone to feel that the

companies were crying unnecessarily. Street railway securities are nearly a drug on the market. It is almost impossible to get new capital into the industry.

Many remedies have been suggested, and many have been tried without avail. The solution in many instances has not been found. We cannot junk the street railway as obsolescent. For the welfare of the community it serves it must live. How best to keep it alive and giving adequate service is not only the problem of its owners and operators today, but it is the problem of the community. The higher-fare solution is not working out to the best advantage. The additional expense of four or six cents a day to the average patron seems to be a matter for serious consideration. Rather than pay it he will walk to his labor, or will move to a neighborhood where it will not be necessary to ride to work. The result will be a congestion in certain districts which will react on the health and morals of a community. The so-called zone basis of rates has a tendency to bring about a like result.

Two new street car rates have recently been ordered by the Wisconsin Commission, the results of which are being watched with a great deal of interest. One is at Racine, and should be designated as entirely experimental. This is an optional rate of \$1 per week to be paid by the holder of the ticket for unlimited riding. The ticket is transferable, and it is only necessary that the holder show it to the conductor as he boards the car. This has been in use less than two months and the company has been selling an average of about 1000 tickets each week. The results have not been as flattering as the company hoped, and it is doubtful as to whether they will care to continue it much longer. The other rate is in use at Oshkosh and Fond du Lac, and results reported are very satisfactory. It consists of a 7-cent cash fare, six tickets for 35 cents, and fifty tickets for \$2.50. The manager of this property feels that he has very definite evidence that the rate is actually producing new traffic.

So the problem has become a social and economic one of which, reluctant though it may be to do so, the community must take heed. On every hand we see evidences of the cities awakening to the gravity of it. Already municipalities have discontinued paving charges, franchise and other taxes, but there are many instances where even these reliefs fail to help. The result is that many city authorities see no way out but to purchase. On the other hand, some of the operators see no other salvation. Other cities have hesitated in taking over the systems but have tried some sort of contract whereby the company is guaranteed a return on its investment in return for continuance of low fares. This latter proposal, however, is often but a preliminary step to acquisition.

However, we may view the reasonableness or the wisdom of municipal acquisition of public utilities, we cannot but feel that the situation affects intimately every regulatory body here represented. We are all more or less familiar with the troubles of street car operation. It is our duty to use our best offices in helping solve them. Whether or not we believe in public ownership and operation it is important that we lend our aid in framing legislation which will give the communities that measure of service which is essential to their welfare.

REPORT OF COMMITTEE ON GRADE CROSSINGS AND TRESPASSING ON RAILROADS

Your committee has no recommendation other than this—that the members of this organization as individuals and as members of regulatory bodies keep awake to the tendency and see to it that whatever legislation is perfected to help solve the problem be the result of experience and study. We do not believe that when a plant is taken over by a municipality it should be freed from the supervision now given privately-owned plants. Rather, we believe that we

should pay greater attention to the newly acquired municipal utility than to one privately owned, that it may be able to render that degree of service which the people expect and to which they are entitled.

The recommendations of this committee in its 1916 report were seven in number. They were decided upon at a conference with a special committee of the American Railway Association which was held for the purpose of formulating some uniform method of protecting all crossings where railroads and public highways intersect. Because of their great importance and the desirability of carrying them into effect, the recommendations referred to are herewith reproduced, as follows:

1. That every grade crossing should be protected by an approach warning sign to be placed in the highway at a distance not less than 300 feet on each side of the railroad tracks, the sign to be a circular disc not less than 24 in. in diameter painted white with a black border and black cross lines with the letters "R. R." . . . Where deemed necessary this approach warning sign to be properly lighted at night.

2. That the railroad companies maintain, within the limits of their rights of way, proper cautionary signs such as are now in use or authorized by law, and where deemed necessary such sign shall be equipped with a red light at night.

3. That all lights displayed at night towards the highway at grade crossings shall be red.

4. That all crossing flagmen use during the day a uniform disc 16 inches in diameter painted white with a black border and the word "STOP" painted thereon in black letters about 5 in. high instead of the vari-colored flags which are now being used.

5. The uniform painting of all crossing gates with alternate diagonal stripes of black and white.

6. That the railroad companies, wherever practicable, be required to maintain their property at grade crossings free of all obstructions to vision; also that the highway approaches to crossings shall be so graded that the free passage of vehicles shall not be impeded.

7. That the National Association of Railway Commissioners, the American Railway Association and the American Automobile Association, consider the advisability of agreeing upon whatever legislation may be necessary in the several states to make thoroughly effective the protection of grade crossings; and that it is our opinion that a uniform law requiring vehicles approaching such a crossing to reduce speed to a safe limit at the warning approach sign is advisable.

Appropriate legislation has been enacted in several of the states putting into effect the uniform crossing protection regulations, but the majority of the states have taken no definite action in the matter.

In addition to the recommendations in 1916 which were endorsed by the association, this committee strongly urges the adoption of standard signs showing the hours on duty of crossing watchmen and stop signs which should be displayed when such crossings are left unprotected, similar to those approved by the Public Utilities Commission of Connecticut.

The automobile has revolutionized the travel on the public highways and by means of this instrumentality citizens travel from state to state and go into new surroundings where they have no knowledge of the presence of tracks and know nothing of the schedule of trains. Therefore, it is very essential that uniform warning signs be employed as a protection for grade crossings.

Within recent years considerable attention has been given to swinging or oscillating signals as a means of protecting crossings, which display a red banner or disk by day and a red light by night, thus conveying the universal danger signal. These automatic flagmen, as they are sometimes called, can be equipped with bell alarms which begin ringing when an approaching train starts the visual signal in motion and keep it up until the danger is past. A great many cities and towns have automatic devices of this kind as a protection of grade crossings and they have proved satisfactory in most instances.

It is contended by the advocates of the automatic flagmen that it is not only necessary to let people know they

are approaching a railroad crossing, but what is more important, to tell them when a train is coming. However, as long as grade crossings exist, there will be accidents at such places in spite of every precautionary measure on the part of the railroad management, the state commissions or the local authorities. Fool-hardy motorists and drivers of horse-drawn vehicles will go across the tracks even when an approaching train is plainly visible and as so often happens will miscalculate the speed of the train with disastrous results.

Force-stop humps in the road or a pile of rocks in the center of the highway calling attention to the proximity of a grade crossing undoubtedly do a good job of abruptly checking the speed of an automobile bowling along toward the crossing at a lively clip, but they are at best crude devices and temporary expedients. It is questionable whether they are more of a menace than an aid to safety. Although they may be life-savers, as they were intended to be, nevertheless they are not infrequently provocative of wrath and profanity, and when a man gets swearing mad he generally throws caution to the winds and becomes careless of consequences.

The carriers in the opinion of this committee should spare no pains in making their crossings safe and at crossings in cuts there should be dugouts or yards to provide an avenue of escape in the event of an impending collision. It might be well to have all crossings at right-angles where possible as a further means of safety to give a motorist or driver an opportunity of getting out of a tight place should such an emergency arise.

Some of the states already have laws providing for the prorating of expenses incurred in the elimination of grade crossings for the removal of the old crossing and the establishment of a new roadway. The commissions of most states probably can apportion the expense between, the railroad companies and the public when grade crossings are ordered eliminated or separated.

Probably the most pretentious program for the separation of grade crossings this year is being carried out in the city of Indianapolis in connection with the construction of new terminal facilities. Every grade crossing in the city will be eliminated, including those of interurban railways. Elevated tracks will be used.

REPORT OF THE COMMITTEE ON PUBLIC UTILITY RATES

The financial condition and outlook for electric railways may be described as bad in most localities, and in others, very much worse. They are not prosperous anywhere. In many sections they are in the hands of receivers, and in some sections they are being discontinued.

Rates have been increased in a great variety of ways, flat rates from the historical 5 cent fare to 6, 7, 8, and 10 cents, but it has not yet been determined what fare will produce the largest revenue. Very likely it will differ in different localities. As a business proposition the street railways must cease to carry passengers 5, 10, 15 or 20 miles for a single fare, as is done in many instances. The cost of conducting the business has become so great that it is no longer possible to fix a fare on the old basis of fare limits, or lack of fare limits, that will produce sufficient revenue to continue the operation of many if not most of our street railways. The lower the fare the larger the number of riders, especially short-distance riders, and the higher the fare the smaller the number of riders, especially the short distance riders, and short-distance riders are a most important factor in the success of the street railway.

Within city limits public policy may require a uniform fare to encourage a wide distribution of residences, but it is an important question then whether the losses on the long-distance riders should be made up by the short dis-

tance riders or by the general public by way of assistance to the railway through relief from street expenses, taxes, or otherwise.

In general there must be a close connection between cost and value of the service and the fare charged. Increases in flat rates from 5 to 6 or more cents have been disappointing in the small increases in revenue.

Some increase has been secured by reducing the length of the fare sections to 2 to 2½ miles in length and using a 5- or 6-cent fare, but there is a considerable element of dissatisfaction in the case of patrons who live a half mile or so from the fare limit and have to pay two fares to ride a mile or two, when neighbors living at the fare limit ride an equal or greater distance for one fare. This inequality is very much lessened by dividing the fare section into two zones. The Massachusetts Northeastern Street Railway has arranged its interurban lines in fare sections of from 2 to 2½ miles in length with two zones to a section, and sells tickets good for three consecutive zones at section rates, *e. g.*, if the fare is 6 cents, five-ride tickets are sold for 25 cents. The use of tickets simplifies fare collections and establishes approximately a workable mileage system over which officials of the company are just now enthusiastic.

From the standpoint of the traveler the straight mileage system is most satisfactory, but from the standpoint of the railway the terminal charge should be considered in some way.

By order of the Public Utilities Commission of New Jersey, the Public Service Railway prepared a plan whereby the method of charging might be revised by an equitable zoning system, proper consideration being given to all of the elements to more properly relate the cost of service with the length of haul and value of service. The report covering the study made, filed on March 5, 1919, adds very much to the available data on the subject.

All urban electric railways must be continued for the welfare of the whole public, and the problem of securing sufficient revenue to continue service is likely to be solved in some cities by a single fare within city limits with such municipal assistance as may be necessary, and in others by a mile zone system with or without municipal assistance. When these methods fail, public ownership is inevitable, and it seems probable that in some cases that time is not far away.

Welding Society Begins Season's Activities

The American Welding Society held its first fall meeting on Oct. 24, at the Engineering Societies' Building, New York City. President C. A. Adams delivered an address, after which papers were presented describing a theory of metallic arc welding by R. G. Hudson; on the repairing of a lighthouse, by J. H. Deppeler, and on gas welding during the war by H. S. Smith. The Metal & Thermit Corporation also showed a moving-picture film illustrating the repairing of the steamship *Northern Pacific*.

Norwegian Electrification Progressing

The Norwegian government has accepted bids for the electrification of the railway from Christiania to Drammen. For this eighteen standard-gage electric locomotives will be constructed in Christiania. This is the first definite step to be taken in the plan for the electrification of the entire Norwegian railway system. The power is to be obtained from the Hakavik power station, which is located not far from Kongsberg, Norway, where about 25,000 hp. can be produced.



NEW 3000-VOLT DIRECT-CURRENT GEARLESS PASSENGER LOCOMOTIVE, WEIGHING 265 TONS, FOR THE ST. PAUL CASCADE ELECTRIFICATION

St. Paul Locomotive Tested at Erie

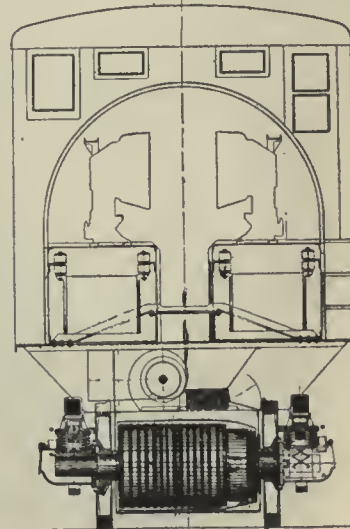
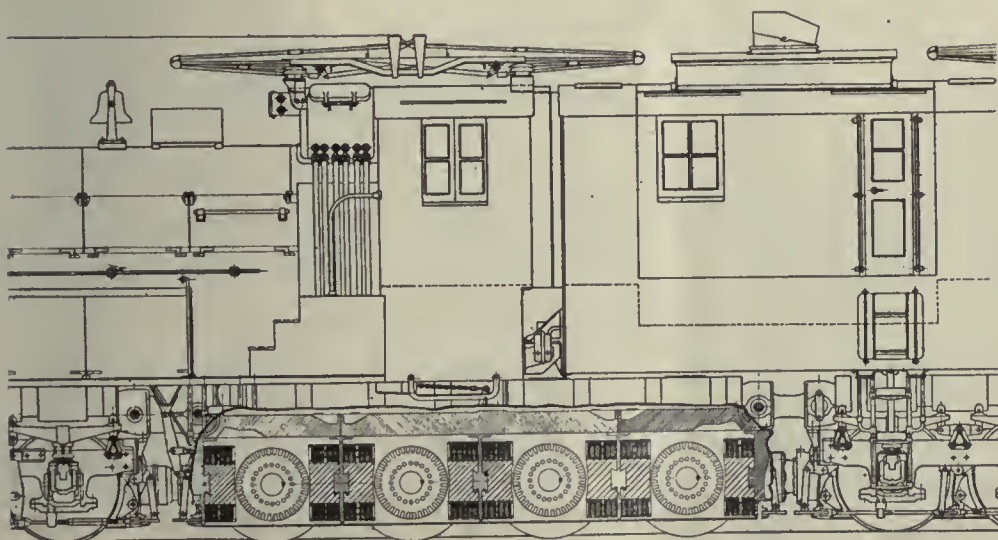
New Type of Machine with Bi-polar Motor Demonstrates Capability of Handling High-Speed Passenger Trains on Othello-Seattle-Tacoma Electric Zone

IN THE PRESENCE of railroad experts and others gathered at Erie, Pa., on Nov. 7 to witness the demonstration, the 3000-volt, direct-current locomotive built by the General Electric Company for the Chicago, Milwaukee & St. Paul Railway was given a series of operating tests. This machine is of the passenger type and is designed for use on the new Cascade electrification. It is equipped with bi-polar motors, gearless type, with motor armatures mounted directly upon the driving axles. In this fundamental feature the new locomotive follows the design of the gearless machines in use on the New York terminal of the New York Central Railroad. The five machines of this type ordered by the railway are now complete and will be delivered at the rate of about one a week, going into commission immediately.

The tests were carried out on a $3\frac{1}{2}$ -mile track owned

by the manufacturing company and used largely for this purpose. A considerable part of the locomotive work of the company is now done at the Erie plant, making the possession of test facilities quite necessary. The program comprised a number of speed runs up to about 60 m.p.h., the limit for the length of track, a series of regenerative runs, and a "tug-of-war" against two powerful New York Central locomotives.

In the speed runs a couple of light passenger coaches only were attached, the purpose being to demonstrate the accelerating qualities of the machine, as well as its riding qualities. In regenerating, the electric locomotives was driven by the steam locomotives already referred to, and the regenerated current was held at such a valve as to maintain a speed of about 25 m.p.h. Under these conditions the ammeter in the substation, through which the



ARMATURE OF ST. PAUL LOCOMOTIVE MOUNTED BETWEEN WHEELS ON DRIVING AXLE



FRANK J. PRAGUE, WHO HAS ALWAYS BEEN AN ARDENT ADVOCATE OF DIRECT-CURRENT TRACTION, IS AT THE LEFT. THE TWO AT THE RIGHT ARE OTTO G. HITCHCOCK AND J. B. COX

test track was supplied with power, showed a current of from 400 to 500 amp., at a voltage of 3000, indicating a return of 1200 kw. or more to the supply circuit.

In the backing or "tug-of-war" test the steam locomotives were first allowed to push the electric machine for a short distance, when the latter was notched up in "reverse," gradually bringing the steam locomotives to rest and ultimately backing them up.

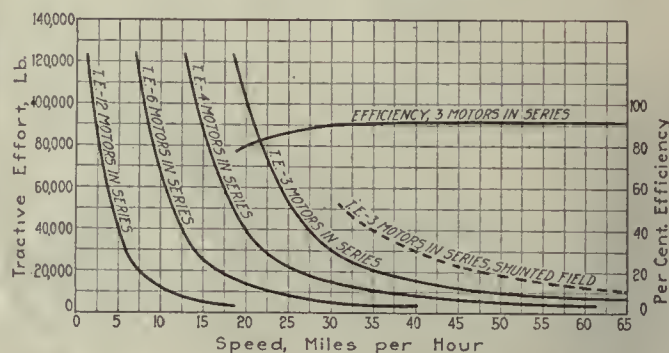
A preliminary account of the gearless locomotive for the St. Paul was given by A. H. Armstrong in a paper read before the New York Railroad Club last spring and printed in the issue of this paper for March 23, 1918, page 561. Additional details are now available. The locomotive weighs 265 tons, of which 229 tons are on the drivers. There are fourteen axles, twelve of which are driving axles and two guiding axles.

The gearless drive was adopted to give simplicity of mechanical design, eliminating gears, armature and suspension bearings, jackshafts, side rods, etc. The weight of the armature and wheels is the only dead weight on the track, amounting to approximately 9500 lb. per axle. This is about 25 per cent of the total weight per driving axle, which is 38,166 lb.

To show the position of the armature relative to the field

poles a cross-section of some of the motors is reproduced. The cross-section of the locomotive in the vertical plane of the armature axis gives further information as to the motor mounting. These views appear at the foot of page 827.

An important feature of the locomotive is the design of the leading and trailing trucks and the method of suspension of the cab weight upon them. The successive trucks are coupled together in such a way as to "dead-

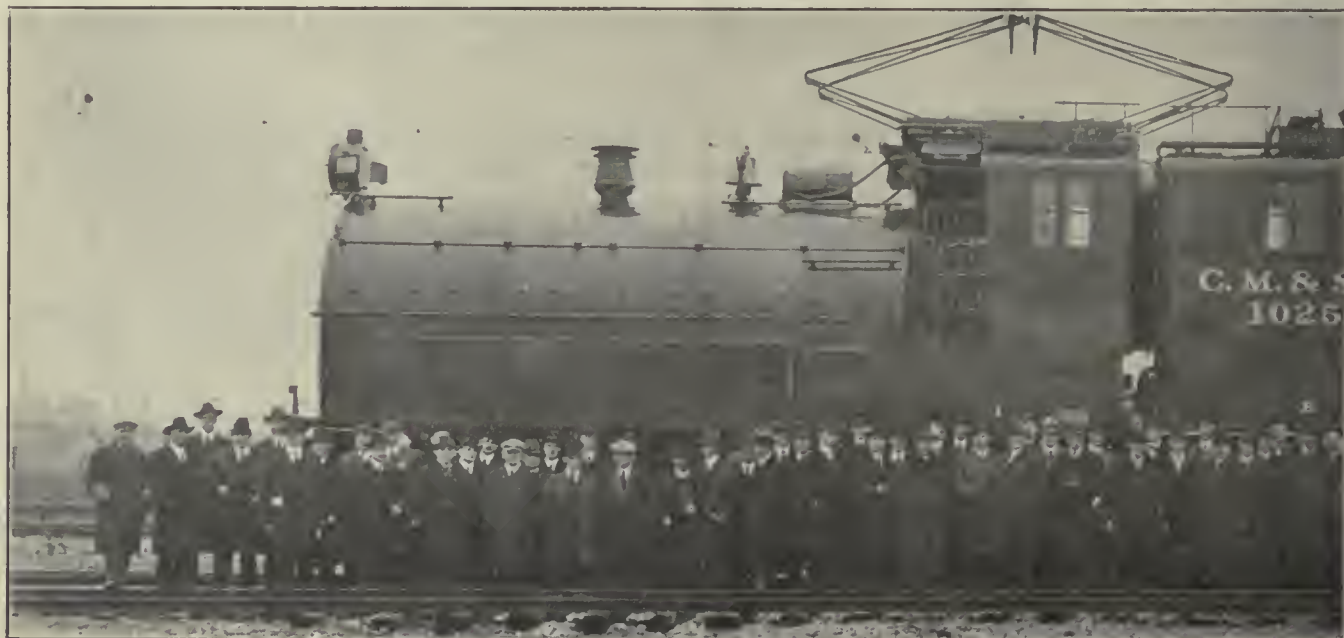


CHARACTERISTIC CURVES OF GEARLESS LOCOMOTIVE FOR THE ST. PAUL

beat" or break up any lateral oscillation which may be caused by inequalities of the track. The weight of the main cab is so supported on the front and rear trucks that any lateral thrust or kick of the leading or trailing wheels against the track is cushioned by the movement of the main cab, which increases the weight bearing down on the wheels at the point where the thrust occurs and automatically reacts to prevent any distortion of the track. This design is said to result in very satisfactory riding qualities at high speeds.

Exhaustive tests on the General Electric Company's test tracks at Erie, Pa., have demonstrated excellent riding qualities of the new locomotive at speed up to 65 m.p.h., the limit on the length of the test track available. The tests also indicate that the locomotive will operate at much higher speeds equally well.

The locomotive is designed for handling in normal service a twelve-car train weighing 960 tons trailing against a grade of 2 per cent at 25 m.p.h. To do so requires 56,500 lb. tractive effort, equivalent to a coefficient of adhesion of 12.3 per cent of the weight upon the driving



GROUP OF RAILROAD MEN GATHERED AT ERIE, PA., TO WITNESS DEMONSTRATION TESTS OF ELEC

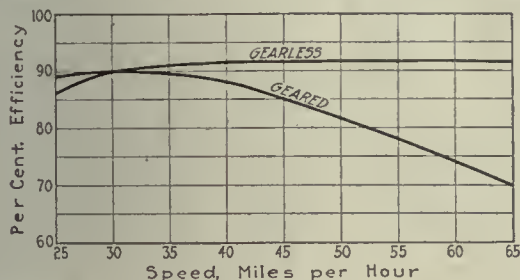
axles. This allows a margin between the operating tractive coefficient and the slipping point of the wheels sufficient to permit the locomotive to hold trains containing as many as fourteen cars in emergencies, and the motors have corresponding necessary extra capacity. For continuous operation the locomotive is designed to operate at 42,000 lb. tractive effort at a speed of 27 m.p.h.

The principal data for the new locomotive are given in the table on page 830.

PART OF THE MOTORS FURNISH EXCITATION DURING REGENERATION

In most respects the control equipment of the new locomotive is similar to that in use on the locomotives which have been operating on the St. Paul for nearly four years. An important difference, however, is in the means used for exciting the motors which are acting as generators during regeneration. Four of the main motors are utilized for this purpose, which is possible because eight motors are ample to supply all of the generator capacity required on down grades.

By thus utilizing some of the traction motors it has been possible greatly to reduce the size of the motor-



COMPARISON OF EFFICIENCY CURVES OF GEARED AND GEARLESS LOCOMOTIVES FOR THE ST. PAUL

generator sets used for control, accessories and train lighting. An appreciable reduction in the weight of the control equipment is obtained and at the same time provision is made for effective regenerative electric braking on down grade.

The motor-generator set furnishes control current for operating the contactors and for charging an 80-volt storage battery which supplies light as well as power for the accessory apparatus.

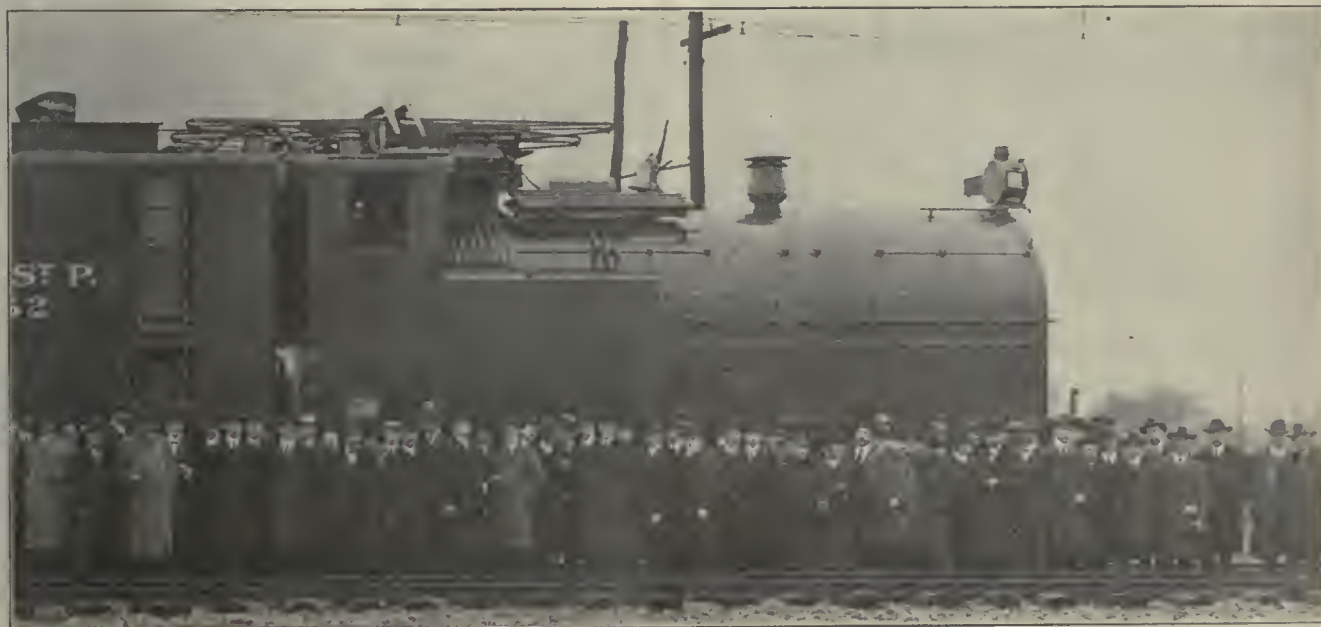


F. C. PRATT TALKING OVER THE FINE POINTS OF THE LOCOMOTIVES WITH H. F. F. ERBEN, J. M. SHERWIN AND M. GRISWOLD

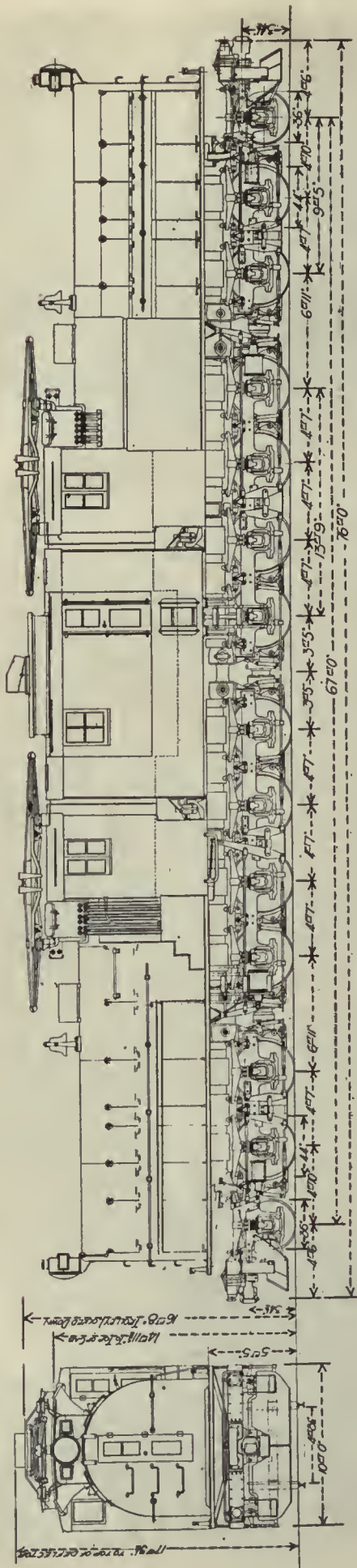
The master controller is constructed in three sections, arranged for both motoring and regenerating, all of the cylinders being suitably interlocked to prevent incorrect manipulation. For full-speed operation the twelve motors are connected three in series with 1000 volts per commutator. Control connections are also provided for operating four, six, or twelve motors in series. Additional speed variation is obtained by tapping the motor fields in all combinations. Cooling air for each pair of motors is supplied by a small motor-driven blower, an arrangement which was adopted to avoid the heavy duct losses encountered when a single large blower is used.

AUXILIARY APPARATUS IS WELL DISTRIBUTED

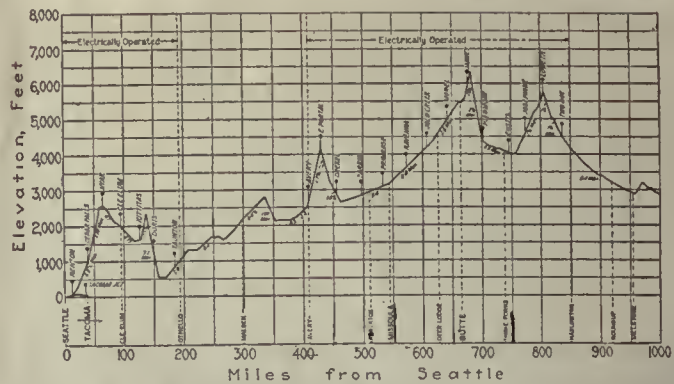
The 3000-volt contactors and resistors are mounted in the curved end cab at each end of the locomotive. In one of these cabs there is also the 3000-volt direct-current air compressor and storage battery. In the other is a small motor-generator set and the high-speed circuit breaker. The operating cabs contain the master controller, indicating instruments, and a small air compressor (in the No. 2 cab) operated from the battery circuit with sufficient capacity for raising the pantograph. Near the controller are the usual air-brake handles for standard braking equipment.



TRIC LOCOMOTIVES FOR THE CASCADE DIVISION OF THE CHICAGO, MILWAUKEE & ST. PAUL RAILWAY



END AND SIDE ELEVATIONS OF GEARLESS LOCOMOTIVE JUST COMPLETED FOR PASSENGER TRAFFIC ON THE CHICAGO, MILWAUKEE & ST. PAUL RAILWAY



PROFILE OF ST. PAUL RAILWAY OVER WHICH GEARLESS PASSENGER LOCOMOTIVES WILL OPERATE

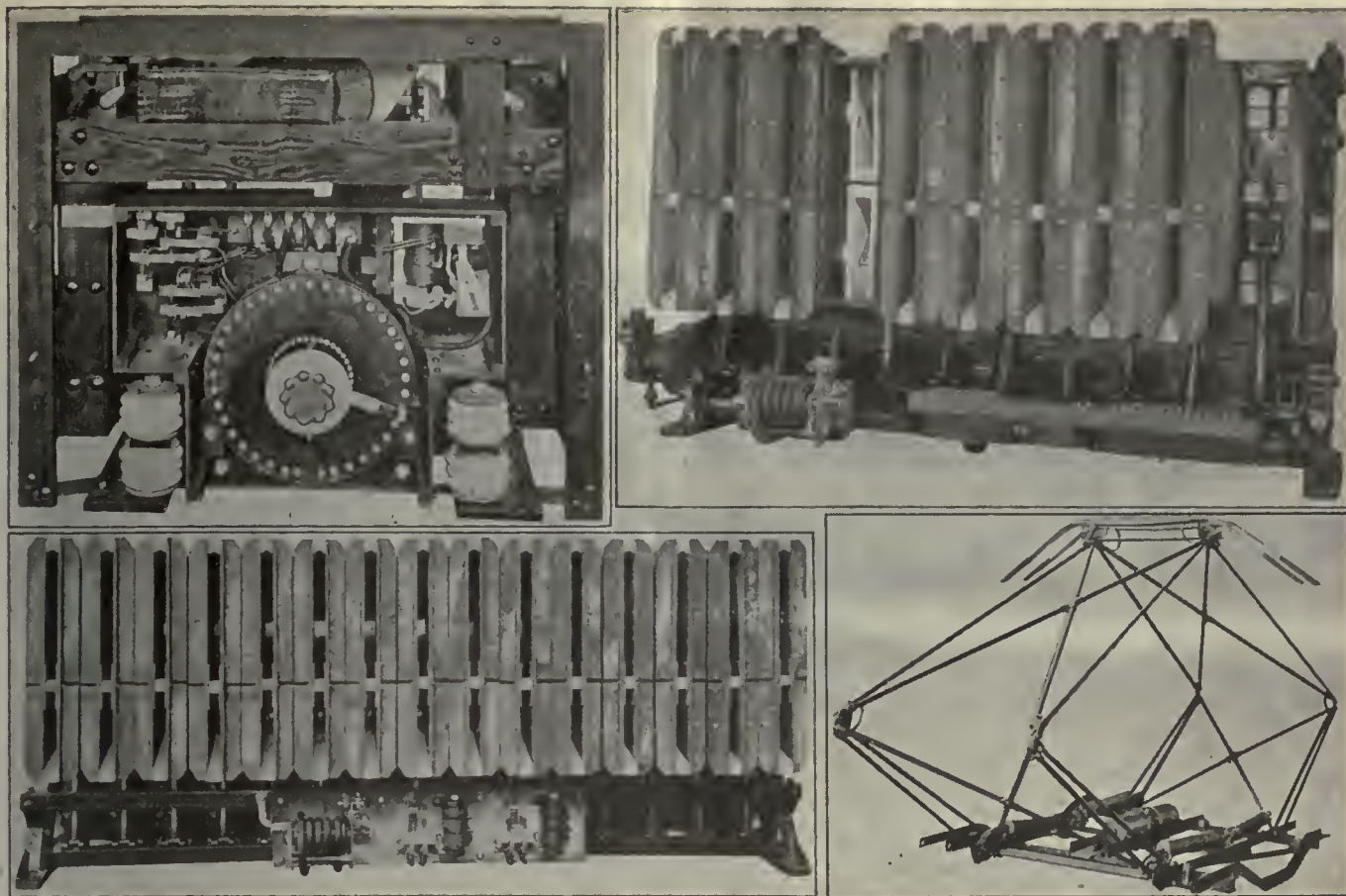
The center cab is occupied by the oil-fired steam boiler for heating passenger trains, with accessories including tanks for oil and water, circulating pumps, and a motor-driven blower to furnish forced draft. A slider pantograph similar in construction to those now in use is mounted on each end of the operating cab. This pantograph has two sliding contacts, giving a total of four points per slider with the double contact wires. The pantograph and flexible twin contact-wire construction enable the locomotives to collect current as high as 2000 amp. up to 60 m.p.h. without noticeable arcing at the contact points. The second pantograph is held in reserve. Sand boxes with pipes leading to each pair of driving wheels are located directly beneath the pantograph outside the operating cab.

PRINCIPAL DATA OF GEARLESS LOCOMOTIVE FOR C., M. & ST. P. RY.			
Length inside knuckles.....	76 ft.	0 in.	
Length over cab.....	68 ft.	0 in.	
Total wheelbase.....	67 ft.	0 in.	
Rigid wheelbase.....	13 ft.	11 in.	
Diameter driving wheels.....	44 in.		
Diameter guiding wheels.....	36 in.		
Weight electrical equipment.....	235,000 lb.		
Weight mechanical equipment.....	295,000 lb.		
Weight complete locomotive.....	530,000 lb.		
Weight on drivers.....	458,000 lb.		
Weight on guiding axle.....	38,000 lb.		
Weight on each driving axle.....	38,166 lb.		
Number of motors.....	12		
One-hour rating.....	3240 h. p.		
Continuous rating.....	2760 h. p.		
Tractive effort—one-hour rating.....	46,000 lb.		
Tractive effort—continuous rating.....	42,000 lb.		
Tractive effort—2 per cent ruling grade with 960-ton trans.....	56,500 lb.		
Coefficient of adhesion ruling grade.....	12.3 per cent		
Starting tractive effort—25 per cent coefficient of adhesion.....	115,000 lb.		
Rate of acceleration starting 2 per cent ruling grade.....	0.48 m. p. h. p. s.		

The new locomotives will operate over the section between Othello, Seattle and Tacoma, including 17 miles of 2.2 per cent grade from the Columbia River west and 19 miles of 1.7 per cent grade between Cedar Falls and the summit of the Cascades. The traffic over this division consists of the heavy main-line transcontinental passenger trains "Olympian" and "Columbian," carrying from eight



TWO POWERFUL STEAM LOCOMOTIVES PUSHING ELECTRIC LOCOMOTIVES IN REGULATION TESTS



TOP, AT LEFT, HIGH-SPEED CIRCUIT BREAKER, SIDE VIEW, WITH COVERS AND ARC CHUTE REMOVED. TOP, AT RIGHT, CONTACTOR GROUP WITH ARC CHUTES IN PLACE. BOTTOM, AT LEFT, GROUP OF AIR-OPERATED CONTACTORS. BOTTOM AT RIGHT, AIR-OPERATED PANTOGRAPH

to twelve steel passenger coaches which will be handled over the maximum grades without helpers. Freight pushers are already in operation on a 2.2 per cent grade, using two of the locomotives from the original electrification. It is expected that electrical operation during the coming winter will assist in overcoming many of the delays which are commonly met with during winter operation in this district.

Dr. Whitten on Zone Fares and City Planning

Zone Fares Would Tend Toward More Economical City Development and Avoid Highly Congested Centers

AMONG the witnesses for the League of Municipalities in the Public Service Railway's zone fare case last summer was Dr. Robert H. Whitten, technical advisor to the City Plan Commission of the City of Cleveland and formerly with the New York Public Service Commission of the First District.

In discussing the comparative merits of the flat versus the zone fare from the city planning standpoint, Dr. Whitten said the flat fare was advantageous for wider spreading of the population and industry. A factory could locate anywhere and draw its labor supply from the entire city because the laborer could be carried for a single uniform fare from any place to any place. The physical development of the American city has been molded in very large measure by the flat fare system. Its development, compared with a European city, was distinctly scattered. The sprawling development of such American cities was, however, uneconomic from the city planning viewpoint. It called

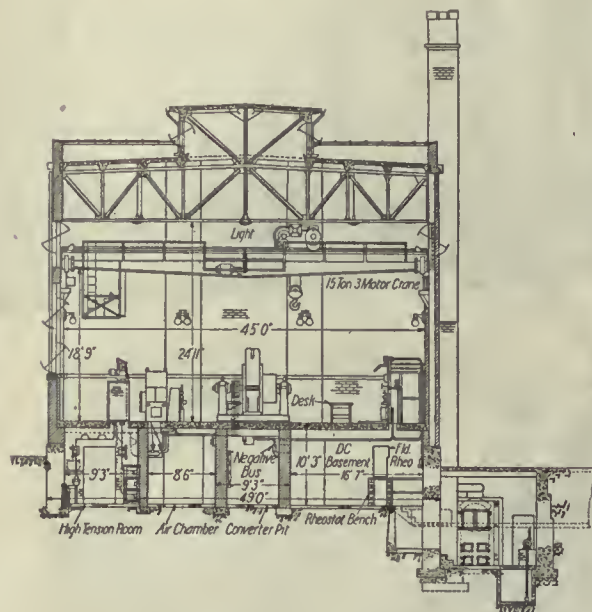
for more miles of track, water pipe, gas pipe, electric wiring, sewers, pavements, etc., thus increasing the cost of supplying the city with the necessary utilities.

The application of the zone fare would tend toward more compact development and also to develop sub-centers for local retail trade, amusement and social purposes. These centers would draw from a 1- to 2-mile radius and would be benefited if the initial fare was 3 instead of 5 cents.

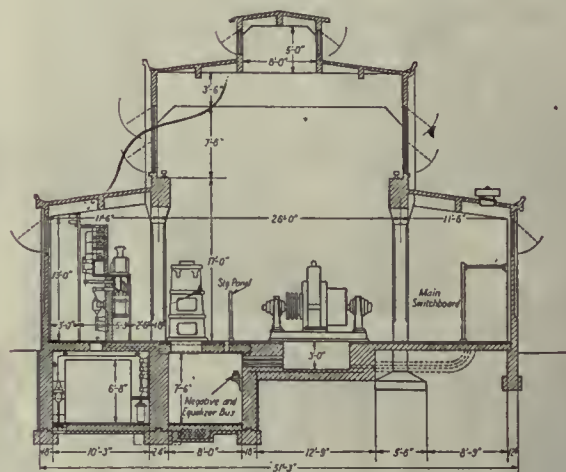
While the American city as a whole was less compactly developed than the British city, there was nevertheless in the largest American cities a compact or even congested central development that was sometimes even more pronounced than in British cities of like size. In spite of the effect of the transit lines in spreading out population, a large proportion of the people from choice or necessity lived close to the heart of the city. As far as the poorer class was concerned, this was largely due to a desire to live within working distance of the largest number of opportunities of employment. It was possible that this tendency toward congestion in the central area with its many light manufacturing plants has been accentuated by the flat fare. A zone fare plan with a low initial fare would probably tend to reduce congestion in the central areas as many families would be able to live a mile or two further out from the center than under a 5 or 7-cent flat rate.

The population spot maps shown by Dr. Whitten included New York, Philadelphia, Cleveland, Chicago, Newark, Boston, London, Manchester, Glasgow, Berlin and Paris. All were on a scale of 2 miles to the inch with one dot representing 1000 people. New York had a marked congestion on the lower east side of Manhattan Island. While central Philadelphia showed no such marked congestion as lower Manhattan, it was congested in comparison with central Paris or London.

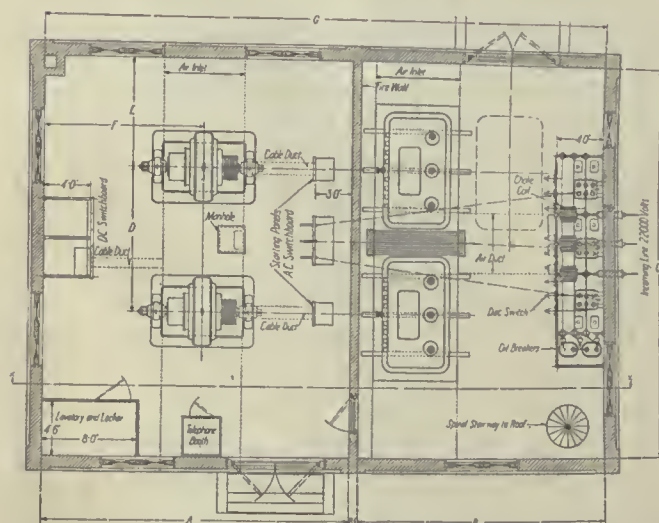
Plan Views Showing Substation, Structure and Position of Equipment



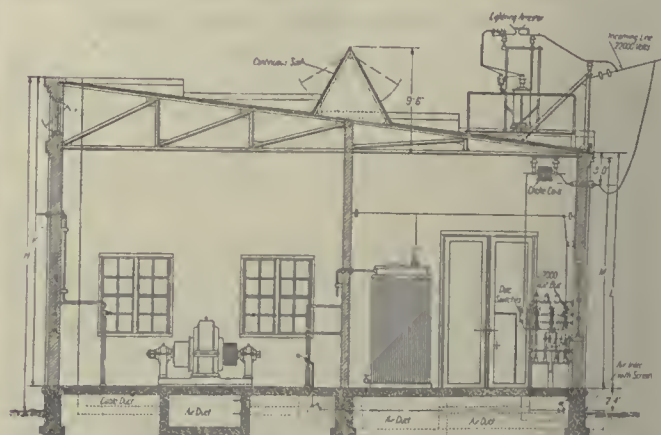
ELEVATION AND PLAN OF CEDAR AVENUE SUBSTATION, CLEVELAND (OHIO) RAILWAY



ELEVATION AND PLAN OF BELVEDERE SUBSTATION, UNITED RAILWAYS & ELECTRIC COMPANY, BALTIMORE, MD.



ELEVATION OF SYNCHRONOUS CONVERTER SUBSTATION FOR SMALL UNITS (SEE TABLE I)



PLAN OF SYNCHRONOUS CONVERTER SUBSTATION FOR SMALL UNITS (SEE TABLE I)



A TYPICAL HIGH-GRADE SUBSTATION BUILDING—CEDAR AVENUE SUBSTATION, CLEVELAND (OHIO) RAILWAY

Some Elements in a Satisfactory Substation Building

By C. F. LLOYD

Manager substation Section Power Department Westinghouse Electric & Manufacturing Company

IN DRAWING up plans for a substation building, there are a number of factors which should receive consideration in the design. Some of these are mentioned in the following paragraphs:

Arrangement of the apparatus should be made to economize space and reduce to a minimum the quantity of low-tension cable required. On the other hand, sufficient space must be allowed around the apparatus to prevent interchange of radiated heat, to provide for efficient cleaning and to permit the making of repairs.

Careful study of the ventilation problem should be made, and good ventilation can be had with but very slight in-

crease in the cost of building. This will materially prolong the life and increase the output of the apparatus. Good ventilation increases the efficiency of the transforming and converting apparatus, since copper losses are lower at lower temperatures. Often conditions are such also, that the load factor can be improved. Good ventilation also improves the efficiency and alertness of the operator.

The ideal system of ventilation is to take the air in at the base of the machine or the transformer and allow it to pass out through the roof by means of monitor construction or metal ventilators. The height of the exit openings must provide for the circulation of air, although usually

TABLE 1—SYNCHRONOUS CONVERTER SUBSTATIONS FOR SMALL UNITS *

Table of Dimensions—600 Volts, D. C.—22000 Voits, 60 Cycle A. C.

Size, Kw.	A	B	C	D	E	F	G	H	L	M
300	17 ft.-0 in.	13 ft.-3½ in.	24 ft.	9 ft.	7 ft.-6 in.	11 ft.-9 in.	31 ft.	25 ft.	19 ft.	18 ft.-6 in.
500	18 ft.-3½ in.	15 ft.-0 in.	24 ft.	9 ft.	7 ft.-6 in.	12 ft.-0 in.	34 ft.	27 ft.	21 ft.	20 ft.-6 in.
750	22 ft.-0 in.	17 ft.-3½ in.	27 ft.	9 ft.	9 ft.-0 in.	12 ft.-9 in.	40 ft.	27 ft.	21 ft.	20 ft.-6 in.
1000	25 ft.-0 in.	20 ft.-3½ in.	33 ft.	12 ft.	9 ft.-0 in.	13 ft.-4 in.	46 ft.	28 ft.	22 ft.	21 ft.-6 in.

* Letters refer to dimensions indicated in plan and elevation.



INTERIOR OF CEDAR AVENUE SUBSTATION, CLEVELAND (OHIO) RAILWAY



INTERIOR OF BELVEDERE SUBSTATION, UNITED RAILWAYS & ELECTRIC COMPANY, BALTIMORE, MD.

the required head room will place these openings sufficiently high to produce the circulation. Unlike the window method of ventilation, this plan will operate during all kinds of weather.

Noise from the machines, especially where substations are located in residence sections, is the next consideration. A noisy substation may become a nuisance, rendering it possible for neighbors to obtain injunctions causing shut-downs. The method of ventilation mentioned above is particularly recommended from the noise standpoint.

While the window area should not be excessive, the building should be well lighted by day to facilitate repairs and inspection. The use of ribbed glass is very desirable, as it eliminates glare and thus facilitates the reading of instruments, gages, etc. Artificial illumination should approach natural lighting, as repairs often have to be made at night. Arrangement of the lighting units should be made with particular reference to the easy reading of switch-board meters, transformer and machine-bearing oil gages, thermometers, etc.

The building should be constructed throughout on a fireproof basis. In some cases it may be desirable either to secure reduction in insurance rates or to provide a greater insurance against interruption, to increase the cost of the building by installing a fire wall to isolate the transformers and oil switches from the converters and switchboards.

Every provision should be made for possible extension of the substation, even though at the time the design is made it appears that no future extension will be necessary. This refers to symmetrical arrangement of apparatus on the unit system and to the proper construction of roof framing.

The building should be simple and substantial, with just sufficient paneling on the exterior to relieve the monotony of a plain wall. An attractive building can be erected at the same cost as an unattractive and poorly designed one if sufficient attention is given to this point.

French Commission Returns

One Member Comments on American Electrifications and Compares Conditions with Those Which Are to Be Found in Europe

THE visit of a commission of French railway engineers to this country last spring to study American electrification installations and methods was mentioned in this paper at that time. The party was thirteen in number, and a greater part of the mission left Paris on April 15 and returned on July 22. The *Journal Official* on Aug. 13 contains a report of the trip by A. Mauduit, one of the members. A copy of this report appears in *Le Génie Civil* for Aug. 30. While an unofficial communication, the report says that the conclusions expressed are in general representative of those of the other members. All of the heavy electric traction installations were visited, including those in the neighborhood of New York; the Norfolk & Western; the Pennsylvania; the Baltimore, Washington & Annapolis; the Chicago, Lake Shore & South Bend, and the Chicago, Milwaukee & St. Paul.

One principal object of the trip was to learn whether there was any system of electric traction for trunk lines so superior to the others that it could be used for all of the proposed electrifications in central and southern France.

The studies of the commission were devoted to the single-phase, three-phase, single-phase-three-phase ("monotri-phase") and high-voltage direct-current systems. The commission had examined the three-phase system in detail

in Italy before coming to America. In that country it is used largely, but not to an appreciable extent elsewhere. The single-phase system, also, had been examined on the Midi Railway in France and the Loetschberg line in Switzerland, and is in immediate prospect on the Swiss Federal Railways, which have adopted it for the progressive electrification of their entire system and have the Gothard line under actual construction. The other systems mentioned exist only in America, hence were the principal objects of investigation by the commission. At the same time the opportunity was taken to study the 25-cycle single-phase system for sake of completeness, the French lines being 16 cycle.

The result of this study was in favor of high-voltage direct current after seeing what the writer called the "remarkable results" obtained by the Chicago, Milwaukee & St. Paul Railway. In fact, he says that he does not hesitate to express himself formally in favor of the adoption of this system, which he believes to be actually the only one suitable for trunk-line operation. It is possible, he concluded, that the single-phase system which presents at first sight the advantage of being adopted to a large variety of combinations, will reach one day a satisfactory condition, but without doubt this point has not yet been reached.

Direct current presents the disadvantage of being a little more expensive at the start on account of the rotary substations, although it ought to be said that to gain any economy in this respect with the single-phase it would be necessary to generate the latter at the low frequency of 16 cycles.

As regards the expenses of operation, only a carefully prepared comparison would determine this question exactly, but the writer does not think the difference would be so great as to determine the choice of system. The complete absence of telephonic and telegraphic interference, however, is a very great advantage possessed by the direct-current system.

Commenting on the different installations, Mr. Mauduit compliments the skill with which the difficulties of the early years on the New Haven were overcome. These difficulties consisted largely of short-circuits on the trolley line or feeders, and inductive interference with neighboring telephone and telegraph lines. The cost of doing so, however, has been great, maintenance cost is still high and the motors are delicate. This electrification was interesting because, save for frequency, it is analogous to the French Midi system.

After reviewing the means employed by the New Haven to mitigate inductive interference Mr. Mauduit says that these are complicated and difficult to maintain although they solve the problem. The arrangement of thirty auto-transformer compensators insures low voltage drop, an advantage as compared with the "suction transformers" (*transformateurs-suciers*) used to confine return current to the rails on the Midi system.

The motors on the Pennsylvania Railroad are of a more modern type and of better commutation. Inductive interference has been overcome to a considerable extent though not entirely.

Taking the single-phase system as a whole Mr. Mauduit does not consider it as far advanced in America as in Europe, due to the higher frequency which must be employed here and to what he considers the less satisfactory development of the single-phase motor in this country. On the other hand, he praises the catenary contact wire suspension as used here and says that the struggle against inductive interference with telephone and telegraph lines has been pushed to a considerable degree. This last-named item would be considered very important in the selection of a system for France.

On the Norfolk & Western Railway the locomotives were

found to be flexible and powerful, but the mechanical design of the locomotives was criticised. The transmission of power from the motors to the axles, by jackshaft and connecting rods, occasions rapid wear of the bearings, disalignment of the trucks or fractures of the crank pins, because of the enormous power transmitted. From the electrical standpoint the principal points criticised were that the phase converter did not give equally balanced phases and the water rheostat did not equally divide the load between the motors, thus causing high maintenance cost. Moreover, the phase converter because of its magnetizing current reduced the power factor. To overcome these troubles, excepting the inequality of load distribution among the motors, the designers are proposing the use of a synchronous converter, although its actual value for this purpose remains to be determined.

Summing up the situation regarding the single-phase-three-phase system, while he feels that the system has been somewhat of a disappointment, the principle at first sight is very interesting. It permits the use of single-phase locomotives or motor cars for use direct with light or high-speed trains, and the single-phase-three-phase locomotives with heavy and slow trains, all fed from the same contact wire.

Some of the comments made on the Milwaukee installation by Mr. Mauduit have already been mentioned. In emphasizing the freedom of neighboring telephone and telegraph lines from inductive disturbance, he says that telephonic communication is good without protective devices, although the telephone wires parallel the railway line for the entire distance. He also mentioned a test made with a multiple telegraph printing circuit normally operating between Spokane and Helena, a distance of 170 miles. The metal side of this circuit was switched over so as to be carried on an unused wire on the railway pole line while the other side of the circuit remained, as usual, an earth connection. Nevertheless, the telegraph circuit worked perfectly for eight days in spite of the fact that three short-circuits were made intentionally between the railway trolley wire and the rail, in the immediate neighborhood of the telegraph wire.

Commenting on other operating points of the Milwaukee system, the author says that with a double contact wire and double shoe (four contacts) it has been possible to collect by pantograph without difficulty 1500 to 2000 amp. at speeds of from 50 to 60 m. p. h. and 4000 amp. at 16 m. p. h.; also that, although the traffic is light—only two passenger and three or four freight trains each way a day—the consumption of energy at the substation amounts to 39.2 watt-hours per ton-mile. This corresponds to an over-all efficiency, from the point at which energy is purchased to the point where it is used, *i. e.*, at the locomotive drawbar, of 50 per cent.

Mr. Mauduit concludes his *Génie Civil* article with this summary of economic considerations with regard to electric traction: "From the economic point of view the information which we have brought back from America is much less complete and exact than the technical data.

"On the other hand, it is necessary in applying American experience to the future of European electric traction to make considerable modifications in the data on account of the two constant principles which differentiate the developments in the two countries:

"First, in America the couplers employed have a rupturing strength of about 149 tons (of 2000 lb.) and it is permissible to use tractive efforts up to 44 tons. In Europe the couplers are of two types, with rupturing strengths respectively of 38½ and 61 tons, and the tractive efforts are limited to 11 tons, although under exceptional circumstances 13 to 16½ tons drawbar pull is permitted in Switzerland.

"Second, in America all passenger and freight cars are equipped with air brakes.

"The result of the above is that in America locomotives are employed that are two or three times more powerful than those in Europe, the freight trains are correspondingly long and heavy and the crews are relatively larger. Exact calculations made by the companies, and above all the results of the pioneer electrifications carried out and the consideration of the actual cost of coal, alone will permit us to determine under what conditions electric traction will be more economical than steam. It is known, however, that the economy will be greatest on the lines with steep grades and heavy traffic and it is probable that on many lines where these conditions do not exist electric traction would be more burdensome than steam.

"Above all the increasing necessity for economizing coal and the great advantage of electric traction which are well known render necessary the most rapid prosecution of the electrification now under way in France, in view of the progressive electrification of the Paris-Lyons-Mediterranean and the Midi railways."

Association News

Chicago Section Resumes Work

ONE HUNDRED members attended the opening meeting of the Elevated Railways company section in Chicago on Sept. 16. The following diversified program was given: Dr. H. E. Fisher, chief surgeon, spoke on first-aid work with the aid of lantern slides; J. H. Mallon, general superintendent of transportation, followed with a brief talk on the necessity for keeping fire apparatus in proper working condition; E. J. Blair, organization engineer, gave an illustrated story of his army experiences in France, and finally there were, as entertainment features, some amusing songs and stories. A nominating committee was appointed to make recommendations to be acted upon at the October meeting.

Connecticut Company Section Considers New Zone System

THE program of the meeting of the Connecticut Company section, held on Oct. 21, was taken up practically entirely with a discussion of the details of the zone system of operation which is to be inaugurated on that property on Nov. 2. The speakers were L. S. Storrs, president of the company; J. K. Punderford, general manager; W. J. Flickenger, assistant to the president, and C. H. Chapman, chairman of the section. By means of diagrams the essential features of the new plan were explained. These will be covered in an article to be published in an early issue of this paper.

A personal feature of the meeting was the presentation of appropriate gifts to Harold Bates, assistant construction engineer, who is leaving the employ of the company to join the technical staff of the Winchester Repeating Arms Company. Charles R. Harte, construction engineer, described the fine work which Mr. Bates has done for the company during the more than ten years during which he has been connected with the engineering department.

As usual the meeting was preceded by a dinner, during the serving of which there was instrumental and vocal music. This meeting was held at New Haven.

News of the Electric Railways

FINANCIAL AND CORPORATE

TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

No Desire for Ownership

Norristown Men Won't Take Railway, Meet Obligations of Company and then Pay Themselves

The trainmen on the Norristown division of the Reading Transit & Light Company, Reading, Pa., are satisfied with the idea of a "fair day's work for a fair day's pay." They do not want to accept the offer of the company to turn the division over to them for operation. The company had offered the division to the men in lieu of an increase in pay of 4 cents an hour or \$2.40 a week.

Before the war, the trainmen on the Norristown division, which takes in Chestnut Hill, Roxborough, Boyertown and Norristown, were getting a maximum wage of 26 cents an hour.

That was the wage paid the men who had been with the company for two and a half years or more. New men received 5 cents less per hour. Then the war came and wages went up to 46 cents for the two-and-a-half-year men and 41 cents for the beginners. Last August the men decided they wanted 4 cents an hour more, making the maximum wage 50 cents an hour.

In the meantime fares had been raised from 5 cents to 6 cents, and then to 7 cents and finally to 8 cents. And with each increase in fare, so company officials say, there was a falling off in the patronage, which was already no more than the economic law of existence calls for.

The company, through its president, E. L. West, told the men there could be no increase in wages. Mr. West told the men that the company then was holding on to the Norristown division with an annual loss, to the extent of \$25,000 or \$30,000.

"Boost the fares to ten cents and raise our wages!" cried the men.

"It can't be done!" retorted the company.

"Why not?" queried the men.

"The people will not pay it. They'll walk instead," came back the company.

But the men still persisted that they wanted that extra 4 cents an hour. So Mr. West wrote a letter to Joseph Piele, president of the union in Norristown, and offered the trainmen—not the 4 cents increase—but the whole railway included in the Norristown division. Mr. West told the men that because the company was losing money he would go to New York financiers for them and arrange that they be backed to the extent of \$25,000 for one year, at least.

The men would not even consider the proposition. The Philadelphia *Ledger* quotes Mr. Piele, speaking for the union, as follows:

We aren't in favor of fighting out things in the newspaper, but I'll tell you the men don't want the line. What would we do with it after we got it? I'm sure I don't know why they want to give it to us.

We had a few real radical fellows here that were for going into the thing right off the bat. If they'd had their way, they'd have taken the line over in a minute. We had a pretty hard time keeping them in check.

But we decided we wanted time to think it over, and we're still thinking.

No, we never even took it up at any of our meetings and we never will. We don't want the line,

and I think the company's just trying to get from under, and pass the buck to us. That's the way I look at it.

And Mr. Piele's views were backed up with talks by the men on the cars. One after the other they said they didn't want the line. In fact, they wanted to interview rather than be interviewed. As soon as they were asked what they thought of the proposition, they would come back with:

"What do you think of it?"

And there the matter stood. They all seemed to have a rather suspicious attitude.

"But the Socialists say the working-men should own everything and get full return from their efforts," was the proposition put to one of them.

"Yes, but we ain't Socialists," came back the ready reply. "We're just plain, common, ordinary conductors and motormen, and we don't want to be capitalists either—just now, at least."

W. T. Burns, of the company, in the absence of President West, made the following statement:

Of course, the men would have to take over all the company's obligations. You see, the Norristown division is made up of several underlying companies to which the Reading Company pays rentals, and these rentals would have to be met by the men just as we have to meet them.

Second Link in Rapid Transit Line

The Rapid Transit Commission of Cincinnati, Ohio, on October 3 instructed City Auditor George P. Carrell to advertise a bond issue of \$600,000 to provide funds for the second link of the proposed rapid transit line. Bids for the work will be asked as soon as the funds are in the treasury. This section lies between Charles Street and Oliver Street and includes the station at Liberty Street.

Work on the first section will be begun as soon as a dam is built across the canal at Ludlow Avenue. The commission has ordered the canal diverted into Mill Creek on October 15. The John Reuble Construction Company was instructed to build the Ludlow Avenue dam immediately following the draining of the portion of the canal to be used.

City Engineer Frank S. Krug's estimate of the cost of the second section of the line is \$513,500. Earth from the excavations will be used to raise several low streets in Camp Washington and this will reduce the cost somewhat, since other disposition of the earth would have been added otherwise.

Claims of those who had leases on the water rights of the canal have been compromised by the commission as follows: Pierce-Atkins Company, \$22,500; Paul Fagin estate, \$15,333; Kilgour estate, \$22,000. Attorney John C. Rogers recently informed the commission that he would bring suits to enjoin payment of any amounts on these claims, as they were only for the surplus water and become void when the water is diverted. Frederick S. Spiegel, attorney for the commission, said the city's contract for the use of the canal bed provided that water leases must be taken care of by the city.

Power Contract Upheld

Agreement of St. Louis Company With Water Power Plant Decidedly Advantageous to Local Railway

The power contracts of the United Railways, St. Louis, Mo., which constitute one of the principle issues in the suit by the John W. Seaman, New York, a stockholder, which put the company in the hands of a receiver, are declared favorable to the United Railways in a report submitted to the receiver by the H. M. Byllesby & Company, Chicago.

The inquiry was started by Receiver Wells for the purpose of determining the wisdom and profit to the United Railways of contracts by which it receives hydroelectric energy from the Mississippi River Power Company (Keokuk Dam) through the Union Electric Light & Power Company. Byllesby & Company assigned W. B. Rittenhouse to pursue the investigation. In the opinion of the receiver he was a disinterested party.

Mr. Seaman alleged the contracts were made by an interlocking directorate for the benefit of the North American Company, which controls the United Railways through ownership of the common stock of the company. He asked that the receiver be instructed to inquire into the advisability of cancelling the present contract, and negotiating directly with the dam company.

Mr. Rittenhouse bases his conclusions on valuations of the properties in question, and, in summing up his report, enumerates three salient features of the contracts as follows:

The Keokuk dam is entitled to approximately \$430,850 more annually than it now receives for hydroelectric energy sent to St. Louis. This figure is \$180,850 in excess of the amount the Keokuk Company has indicated it is willing to accept in a tentative agreement with the Union Electric.

The Union Electric is entitled to \$138,597 more annually than it now receives from the United Railways for the portion of Keokuk power it furnishes the railway. This amount is \$40,153 less than the Union Electric now asks.

The net added return suggested for the Union Company is \$9,000 yearly. This amount is arrived at by subtracting the added cost to the Union Company of the power, which it furnishes the railways.

Finally, the possession of the water-power contracts by the railway effects a yearly savings to the system of \$436,918 over the cost of an equal amount of steam-generated power in the most improved plant that could be erected at this time.

With reference to the conclusion of the engineer that the railway pays \$40,153 less than the Union asks, it is explained the result of the investigation was to disallow the claim of the Union Company for its transformer at Lewis Street. On the other hand the lines that connect it with the Page Avenue station, where the power is received, should be included in the valuation of the properties needed to serve the railways. In summing up, the report says:

It is clear the Union Electric Light & Power Company has made a favorable contract the benefit of which will accrue to the United Railways, since the purchase price of the power constitutes by far the greatest item in the Union Company's charge to the United Railways.

Col. A. T. Perkins, manager for the receiver of the United Railways, believes the power contract one of the best assets of the United Railways, stating if the company was forced to furnish its own power, it would increase the operating costs 71 per cent.

Toledo a Tractionless Metropolis

Ohio City Which Baited Its Railway for Seven Years Hard Put by Withdrawal of Cars

After the withdrawal of electric railway service in Toledo, Ohio, by the Toledo Railways & Light Company, referred to in the *ELECTRIC RAILWAY JOURNAL* for Oct. 25, Henry L. Doherty, of H. L. Doherty & Company, operating managers for the company, left for Kansas City.

The cars and other equipment withdrawn were stored at Toledo Beach and points in Michigan and the current was turned off the trolley wires. As a result interurban cars cannot enter or leave the city. They are being turned at the city limits.

Mr. Doherty later wired from Kansas City to Toledo that he was willing to resume operation at any time the city requested it. He wanted assurances, however, that the city was willing to grant a fair franchise. Negotiations for the past seven years, he said, had come to nothing and the company could see no other step to take than comply with the decision of the voters which makes the ouster ordinance binding. The company had been ordered to remove its tracks from the street at once.

A statement by the company follows:

We have given careful consideration to the situation that now confronts us all with the official announcement made that the ouster ordinance has been adopted by a vote of the people.

We have concluded that to continue to operate in spite of this ordinance, which has been carefully considered and legally passed, is not a proper observance of law and order and subjects us to many grave dangers.

We have, therefore, decided to cease operations.

For seven long and trying years the present management has struggled with this problem and so far without success.

We have done everything it has been possible to do to secure a settlement of this matter. We cannot again attempt to operate our cars until a permanent settlement has been reached, or is assured.

We cannot believe this is a final verdict and therefore, have already started petitions to initiate the ordinance we submitted to the City Council last July.

If citizens want the cars operated, we suggest that they have the City Council rescind the ouster ordinance and pass the franchise we have already submitted to them.

If the ordinance submitted by us is not acceptable to the city, we suggest that they submit one which is acceptable and then provide for the earliest possible election.

If we must salvage our property, we desire to do so now while second-hand material can readily be sold and at good prices.

We regret that apparently we have not been able to satisfy even a majority of the voters of Toledo. We have done the best we could. We accept the verdict which has been rendered. If we cannot be winners, we want to be remembered as good losers.

Mayor Cornell Schreiber, at whose instance the ordinance was passed, made the following appeal to the citizens:

The company's midnight removal of its cars without even a moment's warning to either the city or the public will not appeal to any one, not even to the company's friends. It was an act typical of the hour selected for its performance.

My understanding with President Coates last Wednesday was that the cars should continue to operate until notification from the city that their operation should cease. The city has given no such notice. The action of the company is therefore a plain breach of faith.

It will, in due time, receive the reward it merits. I presume that the company's object is to attempt to compel the Council to repeal the ouster ordinance which the people approved at the recent election. The method which the company selected in this effort to bring about that result will not be graciously met in the public mind.

The company's breach of faith will receive the public condemnation which it deserves.

It is just such acts as this that have brought public service corporations into disfavor and caused the public to view with suspicion, whatever claims public utilities may advance.

The last card, however, has not yet been played. The public is not helpless, and the rights of the public will be fully protected.

In the meantime this is an appeal to all truck owners, jitney bus owners, auto owners, factory owners and every one to let a neighborly spirit pre-

vail. If all these will lend aid in carrying the public, the emergency will be met.

If the cars are still off the streets Monday morning the public will be surprised at the rapidity with which temporary arrangements have been advanced to meet the situation.

The Council meets Monday night and it may be that I shall convene that body at even an earlier hour. I trust the public will not at all be swept off its feet. Whatever is best will be done, always in the public interest.

E. H. Mallory, of the Highways Transportation Company, has been appointed commissioner of transportation to have charge of automobiles and trucks that may haul passengers. An attempt will be made to keep charges down as low as possible, but it is said that charges of from

10 to 50 cents are being made for one-way trips.

The extended contention between the city and the company over the renewal of the franchise is familiar to readers of the *ELECTRIC RAILWAY JOURNAL*. Toledo played with fire for seven long years. Apparently it had come to think itself immune from burns. The city is scotched now and scotched badly. It was only through the exceeding good graces of the management of the railway that the day of reckoning which has now come was delayed so long. The fate that has now befallen the city was delayed in its coming last August only by the concerted efforts of the business men of the city. The company had been ordered by the Council to cease operating on July 31, but a referendum petition, initiated by the business men, resulted in the matter being put before the voters at the election on Nov. 4.

Citizen's Committee Acts in New York

Retains Charles E. Hughes to Seek Solution of Problems Confronting Electric Railways in New York City

The Merchants' Association of New York announced on Nov. 12 that a committee formed at its instance had secured the services of Charles E. Hughes, to make a thorough inquiry into the traction situation in the city with the view of finding some solution of the financial problems which threaten to destroy the transportation systems. Mr. Hughes, it was said, would have a free hand in the selection of his own assistants and of conducting the inquiry until every important fact bearing upon the situation was disclosed.

It was explained that the idea of instituting such an investigation grew out of correspondence between the association and Federal Judge Mayer who appointed the receivers of the Brooklyn Rapid Transit Company, the New York Railways Company and the Interborough Consolidated Company.

A letter to Judge Mayer from the association on Oct. 16 called attention to a statement of the judge that every facility would be accorded to both public officials and civic organizations to satisfy themselves in respect to the actual financial and other conditions confronting the railroad companies. The association gathered from statements by the court that the situation was crucial. Judge Mayer's reply confirmed this thought and suggested that the association could render service of a high value and aid the public and the court if it could carry out the following program:

1. Examine and report upon:

(a) The estimated cost for the twelve months beginning Sept. 1, 1919, of operating each of the several transit systems now under the jurisdiction of the United States District Court, including in such cost, operating expenses and such other outlays as must necessarily be made to continue the operation of the several lines.

(b) The estimated revenues for each of such systems during the same period.

(c) The estimated net earnings or deficit from operation of each of such systems during the same period.

2. Through qualified engineers and accountants, check, test, verify, and report upon any valuations of the physical properties of the several traction systems which may be presented to the court, or affixed as a basis for equitably adjusting the future relations between transit corporations and the public.

3. Make a study of the transit field, with relation to existing franchise and contract rights; possible consolidation or consolidations of existing lines or systems; legal, financial, and operating conditions; and such other factors as may be germane, with a view to formulating a plan for the permanent, equitable, and beneficial readjustment of the relations between the public and the transit corporations which serve them.

Before proceeding further with the mat-

ter the Merchants' Association obtained the co-operation of other large commercial organizations in the city and a preliminary committee was formed consisting of the presidents of the Merchants' Association, Chamber of Commerce, New York Board of Trade and Transportation, Brooklyn Chamber of Commerce, Chamber of Commerce of Queens, and the Bronx Board of Trade. This committee sent an identical letter to more than 100 leading men in various walks, who were selected to form a citizens' transit committee. The letter set forth that the city was threatened with a condition of chaos in relation to its transit facilities; that railroads were not earning enough to pay proper operating costs, and that it was feared that some of the lines would have to cease operating. The letter from the committee said:

The committee will make an adequate, unbiased and wholly dispassionate investigation fully to develop all the pertinent facts, and to form constructive plans for the reorganization of the city's traffic facilities on a basis which shall be substantially equitable to all interests.

An executive committee was named which will have charge of all of the details of the investigation.

The announcement of the Merchants' Association contained no information as to when the inquiry is to begin, but the presumption is that no time will be lost. The committee will have no power of subpoena, so that witnesses may be called and compelled to testify. It is presumed that all of the information gathered by Judge Mayer will be placed at the committee's disposal and any vital information needed which the committee cannot command may be produced through the assistance of the court. Investigation of the various companies has been made by the Public Service Commission, which will also, it was said, assist the committee in every possible way.

Winnipeg Award Announced

The so-called Mathers board of conciliation, which has been considering the matter of wages for the conductors and motormen in the employ of the Winnipeg (Man.) Electric Railway, has prescribed the following rates of pay: First six months, 46 cents an hour; second six months, 49 cents an hour; second year, 52 cents an hour; third year and thereafter, 55 cents an hour.

Massachusetts Program Nearing Completion

Forecast Made of Legislation in the Interest of Electric Railways Proposed by Special Committee of Legislature

The commission is reported to be fast completing its work which has been engaged during the past three months in an effort to agree upon legislation which will permit the transportation systems of Massachusetts to escape the financial difficulties against which they have been struggling for some time. It consists of fifteen members, of whom five were appointed by Governor Coolidge, five by Speaker Warner of the House, and three by President McKnight of the Senate. Former Congressman Charles G. Washburn, Worcester, is chairman of the commission.

WOULD PROHIBIT STRIKES

A sub-committee has prepared a report, upon which the full commission is to act, but inasmuch as the subject matter was fully discussed before the sub-committee began its work, it is believed that this report will be adopted by the commission.

A bill to prohibit strikes by employees of electric railways is the outstanding feature of the report which is being considered by the commission. The anti-strike bill makes it illegal for two or more persons engaged in electric railway service, by concerted action or agreement, to threaten or prevent the continuity of such service. It carefully safeguards the right of any employees to leave his employment if it is distasteful to him, but provides that he may not do so for the purpose of tying up service. Any person thus conspiring against continuity of service is to be held to have been discharged from his position, and his re-employment in any capacity in such service is to be prohibited for a period of one year, to be fixed by the Public Service Commission.

It provides that every electric railway shall enter into an agreement with each individual or group of its employees, stipulating that every dispute as to wages or compensation, hours of labor or working conditions, and every other dispute, shall be submitted to arbitration. In case of failure to agree upon a board of arbitration, the dispute is to be referred to the Public Service Commission for settlement.

The report recommends that every railway be permitted to initiate changes in fare without waiting for permission from the Public Service Commission. At present, whenever additional revenue becomes necessary, the Public Service Commission is required to approve an advance in fares.

EXTENSION OF CREDIT BY STATE

The report recommends that legislation be passed permitting the establishment of transportation areas in communities where existing companies find it unprofitable to operate. In such areas the Public Service Commission would control electric railway operation, through a local manager for each area. Fares would be fixed by the commission, and any deficit would be made up out of general taxation in the communities comprising the transportation area.

For the benefit of electric railway corporations whose credit has been exhausted, the commission recommends that the credit of the commonwealth or of its sub-divisions may be extended.

The commission advises that the present system of private ownership and control should be retained wherever adequate service can be maintained with a reasonable fare. For such companies as are unable to meet these requirements, it recommends private ownership and public control, as is now the policy with respect to the Boston Elevated Railway and the former Bay State systems; and only where this method proves ineffective does the commission favor public ownership. It urges, however, that if there is to be public ownership, it should be by the communities and not by the commonwealth.

Removal of all taxes upon electric railways, except the tax on real estate and machinery and the franchise tax, is recommended by the commission. Included in this recommendation are all charges for construction and repairs of streets and bridges.

CURE FOR JITNEYS

It is recommended that no jitneys be permitted to operate unless the Public Service Commission shall certify that their operation is a matter of public convenience and necessity.

With respect to the former Bay State Street Railway, the commission recommends that the excise tax, amounting in 1919 to about \$277,000, be abolished; that the temporary immunity given the company from the payment of paving, bridge and certain other construction expenses, be made permanent; that the public trustees be given the right of eminent domain, in order that they may eliminate some of the curves which add to the depreciation of equipment, increase the running time and inconvenience passengers. It is also recommended that the amount which any city or town may contribute to offset any operating deficit be increased to the equivalent of \$2 upon each \$1,000 of valuation. At present, a city is restricted to an appropriation of 50 cents on each \$1,000 of valuation, and each town to an appropriation of \$1 on each \$1,000 of valuation.

Detroit Apparently Doing Better

The report on the audit of the Detroit United Railway's accounts for August, by the city's auditors has just been received by the city officials. It is not expected that the figures for the month of September, the final month of the trial period, will be in the hands of the board of arbitration before November.

The audit for August shows the net return of the railway for the month was approximately 400 per cent greater than for the month of July. Of this amount, the company claims an allowance of \$75,000 for depreciation. This, however, is not agreed to by the city.

The arbitration board will decide according to the results of the three months trial period, July to September inclusive, whether or not the company is receiving a fair return on the money invested, under the present system of fares. The company's contention for a charge of 1 cent for each transfer issued, which was advanced at the time of settling the strike in June, will probably be the first question to be taken up by the board of arbitration.

The City Council named Mayor James Couzens to represent the city on the board of arbitrators in place of William H. Maybury, who resigned because of other public duties. Mayor Couzens will act with John J. Stanley, Cleveland, the Detroit United Railway's representative, and Frank H. Goddard, who was chosen by the first two representatives appointed.

No More Women

New York Companies Forced to Replace Them With Men by Terms of Law Limiting Hours of Work

Women workers have disappeared from New York City's subway and elevated lines. The Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company have completed the discharge of women formerly employed as ticket agents and guards and have filled their places with men. This change was made necessary by the passage by the New York Legislature of the Lockwood-Caulfield act, aimed to improve the conditions under which women were employed.

This act, signed on March 15, 1919, provides that no woman shall be employed for more than nine consecutive hours or after 10 p. m. An attempt was made to eliminate the "swing" system under which hours of work are spread out over a considerably longer period, by requiring that women be paid from the time of reporting for work, regardless of the time at which they went on duty.

The law does not bar the employment of women on rapid transit lines, but merely limits the length of time during which they may work. This restriction, however, was sufficient to make the discharge of all the women, except those employed in clerical positions, unavoidable. The nature of the work made it impossible so to arrange schedules that women should not be employed after 10 p. m. or for more than nine hours at a stretch.

The companies employing women as ticket choppers, guards, conductorettes and elevator operators, began discharging these workers soon after the Lockwood act was passed. No attempt was made to discharge them all at once. The Brooklyn Rapid Transit Company, which had been employing women as ticket agents for a number of years, found itself compelled to discharge employees, some of whom had been with the company for more than twenty years. At the time the law was passed there were approximately 800 women in the company's employ. Every effort was made to find other positions for them. By October 1 only thirty-two women remained in the service.

The Interborough was in a somewhat different position. Unlike the Brooklyn Rapid Transit Company, it had begun employing women only as a war measure. Even had the Lockwood act not been passed, the company would have had to discharge some of these women workers, since the men who returned to their former positions after the armistice secured their former seniority ratings, thus forcing the discharge of many substitutes.

The company applied to the State Labor Bureau for a ruling as to the length of time allowed in which to replace its women workers. On September 5 the bureau ordered the company to comply with the conditions of the law forthwith. By that time the number of women employees had been reduced from 1100 to 500. At the end of the following week only 200 remained. These have since been dismissed. The company had no difficulty in replacing them with men.

Electrical Workers to Get More

The State Board of Conciliation of Oregon has handed down its decision in the case of the local electrical union workers versus the Portland Railway, Light & Power Company, in which a higher wage had been demanded by the union. The decision of the board will be binding and retroactive to Oct. 1.

Under the award the minimum wage for men engaged in electrical work for the company will be \$5, instead of \$3.60 as heretofore. The minimum asked by the union was \$5.90. The highest paid employees will henceforth receive \$9 a day instead of \$7.15. The union in its proposed wage scale demanded \$9.15 for these men.

The decision as rendered will mean an increase in daily wages paid by the company of about \$350. The original demands of the union would have called for an increase of \$440 a day.

In spite of the additional expense which the decision will place upon the company in the way of wages, the conciliation board held in its decision that no increase in rates will be justifiable on the part of the company, it being stated that investigation showed that the power and light branch of the business, in which these electrical workers are engaged, has been profitable.

The decision was reached after two weeks' consideration of the problem.

Progress of Electrification in Brazil

Early in the year 1919 the Minister of Communications of Brazil approved plans for the electrification of certain portions of the Central do Brazil Railway, owned by the Government. The estimate for the electrification of the trunk line from Barra to Pirahy has been definitely fixed at \$4,675,000. The director of the Central do Brazil believes that this work can be completed in time for the centenary of Brazilian independence, in 1922. Plans are also being made to enlarge the railway shops, and estimates for this work will be included in the current year's appropriations.

Increase for Spokane Men

An increase of pay for conductors and motormen of the city lines of the Spokane & Inland Empire Railroad, Spokane, Wash., was one of the first steps taken by the new owners of the property, the bondholders' committee, represented by George H. Taylor, of Chicago. Mr. Taylor said:

We have instructed Mr. Connor, the receiver, who will look after the property for us for the time being, to give the traction men the same increase given by the Washington Water Power Company to its men, 8 cents an hour. This increase is to date back to Nov. 1. We have also asked that improvements be made where needed and betterments in the service introduced at once. We mean to put the affairs of the Inland on a good footing, as I believe the outlook in Spokane justifies our efforts.

Reconstruction of Guelph Radial Proposed

At a special meeting of the City Council of Guelph, Ont., on Nov. 3, a report was presented by the Hydro-electric Power Commission covering the question of putting the road into good physical condition and improving the service. Sir Adam Beck accompanied by F. A. Gaby, chief engineer, was present. Sir Adam addressed the Council.

The report stated that \$150,000 would be required to put the line into good running condition. Three different methods of operation were presented; in each case the net loss annually would be from \$5000 to \$7000.

Sir Adam told the Council that if the latter wanted the commission to operate the road on behalf of the city, the commission would be willing to do so, but the city would have to assume all financial obligations. Sir Adam stated that the line could be made to pay if it was operated in conjunction with the proposed system from Hamilton to Galt and Kitchener. He was assured by his engineers that such a line could be made to pay even if it had to parallel the tracks of the Grand Trunk Railway, which he did not think it would have to do.

The City Council ordered the report to be sent on to the railways and manufacturers' committee for consideration.

Pay Increase on Pacific Electric

Increases in the pay of employees connected with the operation of the road were announced recently by the Pacific Electric Railway, Los Angeles, Cal., to go into effect on Nov. 1. The strike was declared ended.

The new schedule of wages includes 42 cents an hour for the first year for city service. This is an increase of 2 cents over the pay for the first three months of service. The pay for the nine following months of the year remains the same.

On interurban service the company makes no change, paying as before 2½ cents more than for city service. On certain single track lines an increase of 2½ cents is made over the present rate. All men in the employ of the freight service receive an increase of 3 cents an hour. The twelve-day vacation each year and the pass privilege after five years' service are granted as heretofore.

The statement announcing the increase was signed by H. B. Titcomb, vice-president of the company. He said that all service was normal and the places of the striking employees had been filled.

Interurban Wages Adjusted

Danger of a strike on the Chicago, Ottawa & Peoria Railway, included in the Illinois Traction System, Peoria, Ill., has been averted. Ballots cast by the trainmen showed that they were in favor of accepting the company's offer of 55 cents an hour as a top wage instead of 58 cents as had been demanded.

The men had been paid 45 cents an hour and raised their demands to 75 cents an hour. The company agreed upon 55 cents an hour as a fair wage while the men scaled their demands down from 75 cents an hour to 58 cents. Australian ballots were used to determine how the men stood. The new wage scale will be as follows:

From Sept. 1, 1919, to Nov. 1, 1919, first-year men, 41 cents an hour; second-year men, 45 cents, and employees more than two years, 50 cents, with brakemen 37 cents. From Nov. 1, 1919 to Dec. 31, 1919, first-year men, 46 cents an hour; second-year men, 50 cents; more than two years, 55 cents, with brakemen, 42 cents. From Jan. 1, 1920, to Dec. 1, 1920, first-year men, 46 cents, more than one year, 55 cents, with brakemen 42 cents. Dispatchers will receive 58 cents an hour from Sept. 1, 1919. All employees will receive their back pay from Sept. 1 of this year.

News Notes

Suburban Line Increases Pay.—The motormen and conductors in the employ of the New Jersey-Pennsylvania Traction Company, Trenton, N. J., have been granted an increase in pay. The new rate is 46, 48 and 50 cents an hour. When the one-man cars are placed in operation the operators will receive 55 cents an hour.

Wage Increase in Yakima.—The trainmen of the Yakima Valley Transportation Company, Yakima, Wash., on Oct. 28 were awarded a wage increase by which the minimum salary becomes 45 cents an hour, and the maximum, reached after being in service eighteen months, 50 cents. Formerly the minimum was 40 cents and the maximum 47, requiring three years service. The raise was granted by the company without any request from the men. The company is operating on 10-cent fares.

New Company Paper in Norfolk, Va.—Leake Carraway, director of publicity of the Norfolk-Portsmouth Division of the Virginia Railway & Power Company, has begun the publication of a new leaflet for distribution on the cars. The first issue appeared without a name and offering \$10 in gold to the person who suggested the most appropriate title. The 20,000 copies which were run disappeared in two days, and during the week about 250 suggestions regarding names were received. The first issue was an eight-page leaflet measuring about 2½ in. x 5 in., printed on fairly heavy paper. It was expected to issue semi-monthly, but the demand for the first number may lead to its publication every week.

Opponents of Railway Elected.—At the last election in Buffalo, N. Y., at which three aldermen of the city were elected, two of the men who have been fighting the International Railway's attempt to get a higher fare were elected by large majorities. One, a Socialist, was elected on the platform that he would appeal the fare case to the United States Supreme Court—and the other, Senator Ross Graves, has always opposed the railways at Albany. He is an advocate of municipal ownership. There is now a majority in the City Council opposed to the International Railway. The Mayor was elected on a platform of opposition to the company and he has opposed the International Railway for the last three years.

Engineering Section of Safety Council.—In accordance with the action of the annual meeting of the National Safety Council on Oct. 1, the executive committee of the Council has approved the organization of an engineering section whose purpose is to bring together the civil, mechanical, electrical, mining and chemical engineers in the council's membership, so that they may contribute more effectively towards the solution of the purely engineering problems so frequently encountered in safety work. The Engineering Section will help to meet the technical demands of the various industrial sections, perform technical services for the National Safety Council, and conduct meetings as part of the annual Safety Congress or otherwise.

Financial and Corporate

Montreal Short \$1,364,111

Statement Made of Operations in Canadian City for Sixteen Months Under New City Contract

The directors of the Montreal (Que.) Tramways in submitting their eighth annual report, point out that for the first period of operations, under the new city contract, being from Feb. 10, 1918, to June 30, 1919, the revenue was insufficient to meet the requirements under the new contract, the shortage being \$1,364,111, of which amount \$692,694 is payable to the city of Montreal, when received.

EARNINGS UNDER NEW CONTRACT

The statement of operations of the company under the new contract for the period from Feb. 10, 1918, to June 30, 1919, is as follow:

Gross earnings	\$11,572,210
Operating expenses and taxes	\$6,640,715
Operating profit	45,927
Maintenance and renewals	2,088,120
Total	8,784,763
Balance	\$2,787,446
Allowances due company:	
6 per cent on capital value	\$3,018,224
4 per cent on working capital	40,645
7 per cent on additions to capital	32,919
Expenses of financing	251,353
Total	3,343,142
Balance	\$555,695
Payable when earned:	
City of Montreal rental	\$692,694
Contingent reserve	115,722
Total	808,416
Balance	\$1,364,111

The gross income accruing to the company from all sources for the year amounted to \$2,303,783, and the expenses to \$1,800,537, leaving a balance carried to the credit of the general surplus account of \$503,246. This added to the amount of \$536,571 at the credit of this account last year, after sundry deductions, makes a total of \$1,039,817.

Under the authority of a resolution of the shareholders of the company, adopted on Sept. 30, 1911, the directors during the year authorized an issue of \$4,000,000 of 5 per cent debenture stock of the company, to be disposed of from time to time as required. Of this amount, \$1,000,000 was sold during the year.

The board expresses regret that the increase in the rates of fares during the past year did not provide sufficient revenue to meet the whole of the company's interest allowance. In consequence the regular quarterly dividends on the common stock for the year were deferred.

Last January the employees of the company made a general demand for an increase in wages to start from Feb. 1, but in view of the conditions of the franchise, under which the necessary allowances for expenditures are provided for yearly, this could not be entertained. Upon the demand of the employees a board of conciliation, as providing under the Industrial Disputes Act, 1907, was authorized. The board, after consideration, authorized a general increase in wages to all employees, effective from July 1, 1919, of approximately \$1,100,000.

The Montreal Tramways Commission, after due consideration of the operations of the past year, and after taking into consideration the requirements for the forthcoming year, rendered its decision on Aug. 29, last, granting a further increase in the rates of fares, which decision has been appealed from to the Quebec Public Utilities Commission by the city of Montreal and some of the other municipalities, and this company.

Interborough Earnings Show Increase

The Interborough Rapid Transit Company, New York, N. Y., reports earnings for September and for the three months ended September as follows:

	September 1919	1918
Gross operating revenue	\$3,842,198	\$3,176,577
Operating expenses	2,512,214	2,007,701
Net operating revenue	\$1,329,984	\$1,168,876
Total taxes	213,536	424,296
Income from operation	\$1,116,447	\$744,579
Non-operating income	42,985	43,399
Gross income	\$1,159,433	\$787,979
Interest, rentals, etc., including Manhattan guarantee	1,644,155	1,429,407
Net corporate income excluding accruals	*\$484,722	*\$641,427
Add accruals under contract No. 3 and related certificates	912,653	547,840
Net corporate income including accruals	\$427,933	*\$93,587
* Deficit.		

Three months ended September

Gross operating revenue	\$10,964,269	\$9,435,624
Operating expenses	7,031,204	5,613,625
Net operating revenue	\$3,933,065	\$3,821,998
Total taxes	640,609	1,081,042
Income from operation	\$3,292,455	\$2,740,956
Non-operating income	134,946	124,620
Gross income	\$3,427,401	\$2,865,576
Interest, rentals, etc., including Manhattan guarantee	4,951,608	4,198,557
Net corporate income excluding accruals	*\$1,524,207	*\$1,332,980
Add accruals under contract No. 3 and related certificates	2,807,601	1,456,661
Net corporate income including accruals	\$1,283,394	\$123,680
* Deficit.		

The company explains that the comparative increase in earnings is due to abnormal conditions prevailing during this period last year, caused by the influenza epidemic and the peak of war activities.

Receiver for "Hay" Company

On appeal of the Northampton Trust Company trustee for the holders of first mortgage bonds of the Northampton Traction Company, Chester Snyder, president of the First National Bank, Easton, has been appointed receiver for the Northampton Traction Company, Easton, Pa., controlled by the Hay interests. The company owns the lines between Easton and Nazareth and Easton and Rangor. It has \$400,000 of first mortgage bonds outstanding. The employees of the road have been on strike for a month.

Inland Empire Foreclosed

Property Purchased on Nov. 1 by the Representative of the Bondholders—Purchaser's Statement

George H. Taylor, Chicago, Ill., acting for bondholders, purchased the property of the Spokane & Inland Empire Railroad at receiver's sale in Spokane, Wash., on Nov. 1 for \$3,600,000. The property was also sought by the Great Northern Railroad, a Spokane & Inland Empire creditor. Bidding against Mr. Taylor for this company was Judge F. V. Brown. He announced as his final offer for the property, \$3,510,000.

During the early part of the bidding, Judge Brown made his first tender on the Coeur d'Alene and Palouse interurban lines, the Nine Mile power plant and the transmission lines. When he reached \$2,900,000, he announced that he was bidding on the property as a whole.

PURCHASER ISSUES STATEMENT

Mr. Taylor made the following statement:

The Inland sale was made as the result of proceedings to foreclose the first and refunding mortgage of the Spokane & Inland Empire Railroad, amounting to \$3,680,000, of which the bondholders' committee represented all save \$61,000. More than 1000 individual bondholders are represented by these holdings, located in all parts of the country and in Europe. To the amount of the mortgage has been added unpaid interest, bringing the total to around \$3,900,000.

There are \$699,000 of underlying or prior mortgages on the Coeur d'Alene line, the Terminal Company and the Spokane Traction Company, which were not involved in the suit and are assumed by the purchaser. These underlying bonds are apportioned: \$422,000 on the Coeur d'Alene line, \$176,000 on the terminal property and \$81,000 on the Traction lines.

F. E. Connor, the receiver, will continue in charge of the property for the time being. He has given satisfactory service, for under his management the condition of the property was greatly improved.

One traction system is enough in a city of this size. We realize that during the receivership the service on some of the city railway lines has not been all that people desired, but with the termination of the receivership we mean to improve conditions. While E. H. Rollins & Sons are not operators, but bond buyers, we propose to see that this property is put into first-class condition while we manage it.

EXTENT OF PROPERTY OUTLINED

Involved in the transaction on Nov. 1 were 212.5 miles of railroad, of which 182.3 is in Washington and 30.2 in Idaho. The main line trackage is 134.3, the remainder being distributed as follows: Second tracks 78.2 yard tracks, sidings and spurs, 48.1. The mileage in Washington is distributed as follows: Traction lines in city, 44 miles; terminal division, 1 mile; Coeur d'Alene division, 20 miles; Inland division, 115 miles. The mileage in Idaho is distributed in the following way: Coeur d'Alene division, 21 miles; Inland division, 9 miles.

In anticipation of the possible purchase of the property by the Great Northern Railroad the City Commissioners placed in the hands of Judge Brown, representing the Great Northern, a type-written schedule and a map of the city property of the Inland that the city would need in the event that the deal with the Great Northern was carried out. The properties listed by the city included the Nine-Mile power plant, the Bowl and Pitcher power site, the Spokane city lines, carhouses and other property.

Regardless of the outcome of the negotiations with the Great Northern, Mayor Fassett believed the proposed amendment authorizing the City Council to acquire a municipal lighting and power plant should be submitted to a vote on Nov. 4. The City Commissioners were practically agreed on this.

East St. Louis Fare Case Valuation

Testimony by Chicago Engineer Covers Appraisal Conclusions Based On Normal Price Trend and On Present Price Level

The East St. Louis (Ill.) Railway has asked the Illinois Public Utilities Commission for an increase in fares. The company wants a cash fare of 8 cents in order that it may be able to meet recent increases in wages and the higher cost of the materials. An extended hearing has been had in the matter in East St. Louis and further testimony will be taken before the case is ready for the commission's study and opinion.

MR. HAGENAH TESTIFIES

The testimony is being taken by H. M. Slater, transportation rate expert of the commission. Testimony covering the value of the railway property, its annual requirement for depreciation and the measure of a reasonable return was offered on behalf of the company by W. J. Hagenah, Hagenah & Erickson, public utility analysts and engineers of Chicago. Exhibits covering the earnings and operating expenses of the company, the effect of the increases in wages granted and the extent of increases in the prices of supplies were presented to the commission by G. W. Welsh an official of the company.

The East St. Louis Railway owns and operates an electric railway in the city of East St. Louis, serving an estimated population in excess of 75,000. The lines of the company consist of 35.8 miles of track, including track represented by curves and special work. The company does not own any power plants, carhouses or repair shops, such facilities being supplied by affiliated corporations. The company does, however, own a modern four-story office building. The rolling stock consists of ninety cars.

The inventory and appraisal of the property was made as of July 1, 1919. The inventory was made in detail from field measurements and inspection, supplemented by the records of the company, the items of property in each case being distributed and classified according to the classification of accounts prescribed by the Interstate Commerce Commission. In connection with the inventory of the property, an inspection was made of the various units and their component parts to determine the degree of maintenance or upkeep in service. An examination was also made to ascertain with respect to each item of property the extent of the wear and tear which had occurred and also the extent to which other factors existed which reduced the efficiency of the unit or affected its future usefulness in service.

WORKING CAPITAL AND GOING CONCERN

Two separate appraisal conclusions covering the physical property were presented to the commission, the first based on the so-called normal trend of prices, and the second based on the level of prices which has developed from conditions growing out of the war, modified to reflect the average level or prices as it is likely to be for some years in the future.

It developed at the hearing that the level of labor and material prices as adopted for the appraisal based on the normal trend of prices was less than the average of such prices for the last five year period and that the trend basis as used by the engineers did not reflect in any way the extreme prices of basic commodities occasioned by war conditions.

In addition to the appraisal of the physical property, Mr. Hagenah testified in regard to the working capital of the company and also its going concern value. Extended testimony was taken regarding the bases on which his estimates were founded and the data which had been compiled in the course of the investigations covering these two subjects.

The following table shows the reproduction cost of the property as testified to by Mr. Hagenah when the appraisal results are (1) based on the normal trend of prices, and (2) when based on the level of prices and wages in effect at the present time and as such prices and wages will probably be some years hereafter:

Way and Structures:	Reproduction Cost on Normal Basis	Reproduction Cost on Present Level of Prices
	On Trend	Level of Prices
Engineering and superintendence	\$61,666	\$88,840
Other land used in electric railway operations	12,600	12,600
Grading	73,209	91,511
Ballast	306,129	446,082
Ties	71,866	79,806
Rails, rail fastenings and joints	251,499	485,915
Special work	109,134	196,441
Track and roadway labor	68,336	102,253
Paving	327,094	409,626
Roadway machinery and tools	6,969	9,050
Bridges, trestles and culverts	24,396	25,972
Crossings, fences and signs	94	272
Signals and interlocking apparatus	4,334	5,634
Poles and fixtures	30,235	39,278
Distribution system	97,909	115,988
General office building	129,198	190,898
Stations, miscellaneous buildings and structures	50	69
Total	\$1,574,718	\$2,300,235
Equipment:		
Passenger and combination cars	314,276	442,541
Service equipment	15,860	19,535
Electric equipment of cars	149,191	178,380
Miscellaneous equipment of cars	53,350	60,000
Furniture	30,495	41,337
Miscellaneous equipment	5,835	7,150
Surveying instruments	663	995
Total	\$569,670	\$749,938
General and Miscellaneous:		
Law expenditures	\$21,172	\$30,502
Interest during construction	133,510	192,344
Injuries and damages	31,758	45,753
Taxes	10,586	15,251
Miscellaneous	44,461	64,054
Total	\$241,487	\$347,904
Working capital	\$55,000	\$55,000
Going concern value	150,000	150,000
Grand total	\$2,590,875	\$3,603,077

Pessimistic Forecast of Baltimore Outlook

In the financial review which appeared in the Baltimore Sun of Nov. 8 there appeared the following comment on the attitude of traders toward the stock of the United Railways & Electric Company, Baltimore:

Attention was attracted to the further sharp decline in the stock of the United Railways in the dealings at the Baltimore Stock Exchange. These shares fell to 12. This is the low record for many years. While 12 was bid at the close, there were additional offerings at 12½.

This stock has been steadily declining ever since the financial position of the company became known and even before the application was made to the Public Service Commission for an increase in fare. The company has not been benefited apparently by the increases allowed, because few believe that even the higher rate gives any promise of a return of the shares to a dividend basis in the near future. In fact, from the later statements of the company of its financial needs and the requirement of the commission

that it spend more in maintenance many have become convinced that a dividend may be some time off, unless the company is able to obtain still further relief.

The actual results of the 64-cent and 7-cent fares have hardly had time to show what the increased revenue will actually be, but from the efforts of the company to have some modifications made in the order handed down it is taken for granted that they are not more than meeting requirements as laid down by the commission.

It is true the stock comes out sparingly, but the fact that even these small offerings can only find a buyer at marked concessions is a straw indicating the general feeling toward it as a dividend yielder. It is also thought that the banks may not now regard this stock as good collateral for loans. It is not known that any of it has been refused as collateral, but when accepted it has to be mixed with other securities to effect a loan. All these factors tend to limit among the small holders and it seems to be this element which is seeking to sell. The fact that the big interests in the company are already carrying large blocks of the stocks may keep them out of the market as buyers. None of these interests is selling its shares, however, but they are sitting tight on the situation. It is difficult to interest the person of small means in a stock which is not paying dividends and most of the local traders and investors in and around Baltimore are already carrying some of it. It is believed to be more widely distributed than any of the other shares dealt in on the local board. This likewise tends to narrow the demand and makes it difficult to effect sales when forced, except at concessions, which some of the holders seem willing to grant.

Financial News Notes

Nominal Capital for Bay State.—The Bay State Street Railway, Boston, Mass., the predecessor of the Eastern Massachusetts Street Railway, has asked the Public Service Commission for authority to make a 99 per cent reduction in its outstanding capital stocks. It was explained to the commission by Artemus C. Townsend, as counsel for the company, that the company has ceased to be an operating company and all its interests have been disposed of. The proposed reduction of stock, he said, is merely for the purpose of aiding in the final dissolution of the company.

American Light & Traction Doing Better.—The American Light & Traction Company, New York, N. Y., has made a statement of earnings to shareholders for the year ended Sept. 30 last. While the earnings show a decrease of \$832,579, as compared with the year ended Sept. 30, 1918, \$689,968 of the loss occurred in the quarter ended Dec. 31 last, leaving a decrease for the first nine months of 1919 of only \$142,611. In this latter period the increase in cost of materials, labor taxes and miscellaneous items, which were beyond the control of the management, amounted to \$1,163,473. The usual dividends in stock and cash were declared.

Elevated Acts to Protect Stockholders.—It was announced following the annual meeting of the Manhattan (Elevated) Railway, New York, N. Y., on Nov. 12 that a new committee had been appointed to protect the interests of the company and its stockholders, in view of the fact that there is the possibility of a default by the Interborough Rapid Transit Company on the payment of the Manhattan Company dividend due Jan. 1, 1920. The members of the committee are: Alfred Skitt, chairman; W. A. Day, Alvin W. Krech, J. H. McClement, S. J. Murphy, and Frederick Strauss. The committee decided that it was not necessary at this time to call for a deposit of stock. Mr. Strauss and E. L. Ballard were elected as new members of the board of directors.

Traffic and Transportation

Chicago Rate Unchanged

Commission Refuses to Suspend Seven-Cent Fare Order Pending City's Appeal to Supreme Court

Supported in its conclusions by an opinion from the Attorney General of the State, the Illinois Public Utilities Commission on Nov. 10 refused to suspend its 7-cent fare order for the Chicago Surface Lines which has been in effect since Aug. 8. It also refused to heed the petition of the city authorities for reparation and impounding of excess fares. This action was based on the theory that the Illinois Supreme Court alone has authority to suspend the 7-cent fare owing to the pendency of the original case on appeal.

This decision of the commission came as a surprise to the city's lawyers because apparently authentic statements had been published to the effect that some reduction in the rate of fare would be made at once although hearings on the valuation and permanent rate have not been concluded. It was announced that the city would immediately file a bill in court to enjoin the collection of any fare above the 5-cent rate specified in the ordinance.

The commission in its decision held that the advance in rates allowed last August was necessary to meet the high wage scale following a strike and that the refusal of such assistance would have meant confiscation. It also held that the State through this commission had the right to cancel or modify the contract ordinance under which the Surface Lines operate. The city, according to this decision, had neglected its opportunity to ask the Supreme Court to suspend the 7-cent fare, and since the appeal was pending even the commission could not reinstate the old rate. It was, therefore announced that the taking of evidence would proceed.

ATTORNEY GENERAL UPHOLDS POWER OF COMMISSION

Attorney General Brundage, who had been asked by the commission to give his opinion on the case, took the stand that the commission, while it could not suspend its order, was free to proceed with the taking of evidence with a view to fixing a permanent rate. He held, however, that the commission's order was temporary in its nature and that there was nothing to prevent the issuance of a permanent order based on a thorough valuation of the company's property. At the same time he ruled that the Illinois Supreme Court had unquestioned authority to suspend the present rate.

Mr. Brundage said in his opinion:

In the first question you ask whether the Supreme Court, during the pendency of the appeal, has authority to suspend the commission's order of Aug. 4, 1919, and thereby annul for the time being the schedules which authorize the collection of a 7-cent fare.

I am clearly of the opinion that with the entire proceeding now pending in the Supreme Court of Illinois, said court has full authority and jurisdiction to entertain a motion by the city of Chicago to suspend the order of your commission during the pendency of the appeal, as provided in section 71 of the public utilities commission law.

In your second question you desire my opinion as to whether, during the pendency of the appeal, the Supreme Court is the only tribunal which is authorized to suspend your commission's order.

For the same reasons your commission is itself without authority to suspend, modify, alter or rescind the order which your commission entered on Aug. 4,

1919. The subject matter of that order has passed from your control, and is now vested in the Supreme Court of Illinois, and that tribunal is, in my opinion, vested with the sole jurisdiction upon the existing state of the record, to suspend the operation of your order, or to take such action in respect to the same as shall seem proper in the discretion of the court.

It is not my intention, however, by the foregoing opinion to indicate that your commission is without power and authority to say what fares shall now be charged and collected by the Chicago Surface Lines. It is my understanding that subsequent to the entry of said order of Aug. 4, 1919, additional testimony has been received by your commission as to the valuation of the companies' property and the receipts and disbursements of operation under the 7-cent fare, and it is respectfully suggested that upon showing being made made of the existence of a new and different state of facts, not contemplated when your former order was entered, your commission may then, in the light of the more complete information before you enter a new order granting such relief to the public as all of the facts and circumstances may warrant.

CITY STILL WANTS TRANSPORTATION DISTRICT

On the same day that the commission refused to suspend the 7-cent fare, the City Council endorsed Mayor Thompson's traction plan. Although the Council will have no authority until next January to vote the required appropriation of \$250,000, the Mayor announced that he would assume responsibility for employing engineers and others who are to make preliminary studies for carrying out his plan.

This plan, mentioned in previous issues of the *ELECTRIC RAILWAY JOURNAL*, contemplates the forming of the Chicago Transportation District and the election of five trustees to take charge of all electric railway matters. The question of payment for the properties and the securing of new enabling laws are expected to take considerable time.

The city authorities appeared to be embarrassed by the decision of the United States Supreme Court on the same day dismissing the city's appeal in the service case affecting the Chicago Surface Lines. This ruling appeared to sustain the State Supreme Court in holding that the contract ordinances are subject to modification by the Public Utilities Commission. This is the main point against which the city's lawyers have been arguing in the pending fare case.

Brooklyn Needs Eight Cents

The final report of Stone & Webster, the experts employed by direction of Federal Judge Mayer to investigate the financial condition of the various railroad properties in New York in the hands of receivers, has been completed so far as it relates to the surface lines of the Brooklyn Rapid Transit System. According to the figures compiled by the experts, nothing less than an 8-cent fare will suffice to restore the lines financially, and perhaps the fare would even have to be increased to 10 cents. Tables of figures in the report disclose the various additional earning power of a 6-, 7- and 8-cent fare.

An 8-cent fare, beginning Jan. 1, 1920, the report states, would leave the company with a deficit for its surface lines on June 30, 1922, at the rate of \$1,262,000 a year. The deficit at a 7-cent rate would be \$1,974,000. But if the fare remains at 5-cents the loss for the year ending June

30, 1922, is estimated at \$5,326,000. At a 6-cent rate the estimated loss for the same period is fixed at \$3,296,000. The report says:

Neither 6-, 7-, nor 8-cent fare, will be sufficient in view of the recent 25 per cent wage increase, to pay expenses, taxes, and the fixed charges, including rentals on leased property, even with the transfer charge in effect and such additional economies as appear feasible.

Concerning the transfer situation the report says that the expected additional revenue coming from the elimination of the 15,000,000 transfers between surface and rapid transit lines will amount to about \$27,000, and that if all transfers between surface lines were eliminated, including those for which a charge of 2 cents is made, the estimated increase in revenue would be from \$875,000 to \$1,050,000. The introduction to the report explains that while the figures differ slightly from those in the preliminary report submitted to Judge Mayer in September the changes "do not alter but rather emphasize the conclusions of the earlier report."

Reference is also made for the need for the same rate of fare on the rapid transit lines as that obtained by the surface lines in Brooklyn.

Safety Car Problems Solved

Richmond Has No Difficulty With Segregation of Passengers—Little Cars Push 57,000-lb. Cars

The negro problem in relation to the installation of one-man cars has caused some concern to C. B. Buchanan, general manager of the Virginia Railway & Power Company, Richmond. The cars thus far installed in Norfolk and Richmond have been operated on lines on which the negro travel was light. Mr. Buchanan says that as long as the negroes constitute not more than 30 to 35 per cent of the total population, the ordinary method of segregation works out satisfactorily with the safety cars. On lines where the negro percentage is higher than this, he was of the opinion that it might be necessary to make every third car a "Jim Crow" car, or to resort to some plan of segregation.

In Petersburg, where the lines are also operated by the Virginia Railway & Power Company, twenty safety cars are giving practically 100 per cent of the service, only two trippers being operated morning and night for one trip each with double-truck cars. This town has a large negro population, but the distances are short and the negroes do not ride very much.

In Richmond, the eighteen safety cars in operation at present make up the complete equipment on two lines. For a distance of 1½ miles through the center of the city, these two lines run over the same tracks as five other lines on which the cars are all of the double-truck type, and there is also a very heavy grade. These conditions have presented no difficulties and the safety cars have not in any way delayed the double-truck cars.

In connection with this mixed service, Mr. Buchanan had some misgivings as to what might happen if one of the big cars (some of them weighing 57,000 lb.) should stall and a little safety car should be the next car to come along. This apprehension was completely dispelled by tests made at the shops and carhouses. It was found that one of the big cars stalled in the middle of a sharp curve could be coupled and moved with apparent ease by one of the safety cars. It is expected that by Dec. 1, there will be sixty safety cars in operation in Richmond.

Public Service Accepts New Zone Rates

Commission Again Rejects Railway's Appeal for a Return to the Flat Rate Fare

On Oct. 30, the Board of Public Utility Commissioners of New Jersey again rejected the Public Service Railway's second application for a return to the 7-cent flat-fare. The board instead demanded the acceptance of its recommendation for a fare of 5 cents for the first two zones with a 1-cent charge for a transfer and a 1-cent charge per zone after the second. The reasons given by the board for dismissing the application for the 7-cent fare were that no new facts had been brought out by the company since its first application had been passed upon and that the second application was not made in good faith because there could only result further applications for increases in flat fare.

OTHER FARE METHOD NEEDED

From the facts brought before the board, as to value, it is apparent that with the continued existence of the high costs of operation some other method than that of the flat rate must be considered. The board reiterates its conclusions contained in its former reports, that it is highly desirable that the zone plan be permitted to have a fair trial; that a fair trial would be more likely to be had under the schedule of rates recommended by the board than under any other rates proposed, and that said schedule of rates would yield to the company as much revenue as the 7-cent rate with 1 cent for a transfer would yield under existing conditions.

Continuing, the board said that in proposing various schedules of rates, the president of the railway stated at the hearing of Oct. 21, that the company was willing to try out any reasonable method that the board might suggest, but the day of experimentation with the railway is pretty nearly at an end. The rates now recommended by the board, in its opinion, will produce approximately as much revenue as the alternate flat rate last suggested by the company and will probably do much toward restoring normal traffic.

Commissioner Gaul filed a dissenting opinion, in which he said that "for the reasons heretofore expressed, I am of the opinion that the zone fare should be abrogated, and the 7-cent fare with 1-cent for a transfer should be put into effect."

On Nov. 11 the railway filed with the commissioners a temporary acceptance of the rates suggested by them.

The new zone fare rate—5 cents for the first two zone miles, 1 cent for each zone mile thereafter and 1 cent for a transfer—was to go into effect on Nov. 16 on all Public Service Railway lines.

COMPANY ACCEPTS PLAN

The company's acceptance of the order of the Board of Public Utility Commissioners is as follows:

The Board of Public Utility Commissioners has expressed the opinion that the zone system of fares now in force on Public Service Railway has not had a fair trial, and has recommended a further trial of the system with a modification of the schedule of rates.

The company filed a statement, showing the results of the operation of this plan, and expressed the opinion, based on these facts, that the zone system was a failure as applied to this property. This conclusion was stated with great reluctance because all concerned had hoped that the plan would furnish the basis of settlement of the street railway problem.

The company, however, has no pride of opinion in the matter, and is willing, out of deference to the expressed opinion and recommendation of the board as set forth in its last two reports on the sub-

ject to continue the trial of the present zone plan for a limited time with the modified rates of fare recommended by the board. The company takes this position in the hope that the board, the public, and its employees will all co-operate with it in this further trial of the zone plan, so that there may be no difference of opinion about its success or failure.

The company, therefore, states that on Sunday next, Nov. 16, 1919, the present zone rates charged will be modified as recommended by the board, so that on and after that date the rates will be 5 cents for the first 2 zone miles or fraction thereof traveled on one car, and 1 cent for each additional zone mile or fraction thereof traveled, with an additional charge

of 1 cent for a transfer to be used only in connection with a continuous trip, upon the payment of the rate of 1 cent for each zone mile or fraction thereof traveled; school tickets to remain as at present; children under seven years of age when accompanied by an adult paying fare, to be carried free; super-imposed service and continuation tickets to be continued in operation wherever now effective.

The company agrees to this plan and these rates in accordance with its understanding of the board's intention, only as a trial for a limited period, and accepts the conditions set forth in the report of the board dated July 30, 1919. The result of this further trial under the new rates will be carefully noted by the company and placed before the board, and every facility and opportunity to study and check up this trial will be furnished by the company to the board and its representatives.

The company, in accepting this recommendation of the board, and the conditions as stated above, reserves to itself all and every one of its legal rights, including the right to apply for further or other relief.

Fare Decision in Abeyance

Wisconsin Commission Withholds Racine Increase Pending Trial of Safety Cars—City's Attitude Undetermined

In September, 1918, the Railroad Commission of Wisconsin rendered a decision on a petition of the Milwaukee Light, Heat & Traction Company, a subsidiary of the Milwaukee Electric Railway & Light Company, for an increase in fares in Racine. It granted a cash fare of 6 cents, children's fares of 3 cents, with five tickets for 30 cents good for transportation in all hours and with ten tickets for 55 cents good for transportation between the hours of 6 a. m. and 8 a. m. and 5 p. m. and 7 p. m. On a subsequent application of the company the commission authorized the issuance of dollar tickets permitting unlimited riding within the period of one week. The latter aspect of the situation was referred to in the *ELECTRIC RAILWAY JOURNAL* for Sept. 6, page 502.

Since that time a dispute has arisen in the transportation department of the company in regard to wages. This dispute was decided by the Board of Conciliation which filed its report with the commission. According to the laws of the state it remains with the commission to approve or reject the decision of the board and issue an order accordingly.

The fare situation in the city of Racine is not satisfactory. The present fares are unsatisfactory to the city, while the company insists that the revenues are insufficient to pay a reasonable return. The company has taken the position that it will insist upon compliance with the provisions of Chapter 530 of the laws of the state, and will not grant the wage increases found reasonable by the Board of Conciliation unless granted an order giving relief provided by said chapter.

The hope of cheaper service rested upon the possibility of using one-man cars, and a committee appointed by the Common Council of Racine has made a study of this question, but does not feel ready to pass upon it at the present time. The city has asked for an extension of time for consideration of the use of the safety car, its position being that the rates when adjusted should be such as would insure the company a reasonable return; that, in the meantime, in view of the negotiations, and the strong probability that the city would co-operate with the company along the lines desired, it was reasonable to request the company to put in effect the wage scale fixed by the Board of Conciliation and to hold the matter of fares open for a short period, pending final settlement and adjustment. The company contends that it has been losing money and not getting a reasonable return, and will be still farther from a reasonable return when the wage scale goes into effect, and

that it is unreasonable to request it to continue the present fares pending such negotiations.

In judging of the necessity of providing increased revenues to enable the company to pay the wages established by the Board of Conciliation, the commission said:

In some cases which we have studied there appear to have been cycles in maintenance work which makes the use of the maintenance expenses as of any particular period decidedly unfair. There are periods when maintenance is unusually low. It would be unfair to the utility to base rates for the future upon such low maintenance costs, and there are times when maintenance is unusually high, and it would be equally unfair to the public.

REDUCES MAINTENANCE ALLOWANCE

From studies which it has made in the Milwaukee system of the same company the commission has deemed a fair allowance for maintenance expenses for equipment and way and structures to be 5.15 cents per car mile. Figures submitted by the company for the eight months ending Aug. 31 show this amount to have been 9.6 cents per car mile. The commission has therefore considered itself justified in reducing the company's figures by \$37,204.

In the recent Milwaukee case the commission also made an allowance of 2.78 cents per car mile for general and undistributed expenses. The figures submitted by the company for the first eight months of 1919 showed this figure to be 4.17 cents per car mile. The commission therefore considered itself justified in reducing the company's figure by \$11,647.70.

The commission said:

It does not appear to us that it is unreasonable to the company to base the allowances for the Racine city system on the allowances made in the recent Milwaukee case. The allowances made for the Racine city system are even higher in proportion to the indicated value of the property than the allowances made for the Milwaukee system. They are the same allowances per car mile as those made for the Milwaukee system, and the number of car miles per year per dollar of property value is higher in Racine than for the Milwaukee city system.

With the adjustments made accordingly the return on the total utility capital as reported by the company would be 6.1 per cent for eight months or at the rate of a little more than 9 per cent a year.

APPROVES ONE-MAN CARS

The commission stated that just what the saving from the operation of one-man cars will amount to cannot be foretold, but that there seems to be no question that the saving will be very material and in the opinion of the commission will be at least sufficient to offset the increased wages resulting from the award of the Board of Conciliation. The commission

states that were it in a position to make a definite order in regard to the use of one-man cars in the city of Racine, it is certain that no modification of the present rates of fare in the nature of an increase would be warranted.

Continuing, the commission said:

In this order, however, we shall in the first instance act on the assumption that when the city has made this investigation it will deem it to be wise public policy to agree to the use of one-man cars in the city of Racine with supplementary service to take care of the heavy traffic during rush hours. On the assumption that this will be the final decision of the city of Racine we find at this time no reason to provide for increased rates of fares in the city of Racine. That the time intervening before the one-man cars may be installed may be made as brief as possible, a final decision on this question should be reached within about two weeks from the date hereof. If it shall be the judgment of the city that it does not desire the use of one-man cars in the city of Racine the city will notify this commission to that effect on or before Nov. 17. In that case the commission will establish a revised schedule of fares if such shall be found necessary.

The commission confirmed the report of the Board of Conciliation fixing the fair, equitable and just wages in the transportation department of the Racine city railway system, and the company was ordered to make such wages, hours of labor and working conditions effective.

Relief in Sight For San Antonio

Judge Duval West of the United States District Court on Nov. 3 issued an injunction restraining the city of San Antonio, Tex., from interfering with the collection by the San Antonio Public Service Corporation of fares in excess of 5 cents. Judge West held that the revenue derived from the present 5-cent rate is insufficient to provide a fair return upon the company's investment. City Attorney R. J. McMillan has announced that he will appeal from the court's decision if the company installs a 7-cent fare.

The injunction came as the climax to a long-drawn-out legal battle between the city authorities and the company. The latter more than a year ago applied to the City Commission for permission to charge a 6-cent fare. The request was refused, as was a second appeal to the commission. The company then brought suit to have the city restrained from enforcing ordinances which provided that the fare should not be raised above the 5-cent rate stipulated in the franchise agreement of 1899. The case was heard before Frank H. Booth, master in chancery, who recommended that it be dismissed for lack of jurisdiction.

Judge West held that under articles 5 and 14 of the Federal Constitution the court had jurisdiction. He therefore overruled Mr. Booth's finding as to jurisdiction, and accepting the master's estimate of revenue derived by the company under the 5-cent fare, ruled that the fare was insufficient and that the company was entitled to relief.

First Mortality Among Buses

G. A. Whalen, Commissioner of Plant and Structures of New York, has explained that the bus line known as the Bay Ridge-Fort Hamilton line, had gone out of business because of lack of patronage. It was the first failure of one of Mayor Hylan's lines, and the commissioner said the line had been started at the request of the people of the Bay Ridge section. He said if individual owners of buses could not earn enough to support themselves and their conveyances they would have to quit. Other bus lines being operated by the city, he said, had been financially successful.

Transportation News Notes

Six-Cent Fare Continued.—The State Public Utilities Commission has authorized the Kankakee (Ill.) Electric Railway to continue in effect until Jan. 7, 1920, the present 6-cent fare in that city. Nineteen tickets will continue to be sold for \$1.

Reserves Decision on Fare Increase.—The Public Service Commission for the Second District has reserved decision on the application of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., for an increased fare and cancellation of the transfer privilege with the International Railway. The application for increased fare is based on a physical valuation of \$1,143,553.

Fare Case Carried to I. C. C.—Leroy Browning, Corporation Counsel, of East St. Louis, Ill., following the rejection of a petition to reopen a hearing on an injunction granted by Federal Judge George W. English of the Eastern Illinois District permitting the East St. Louis & Suburban Railway, East St. Louis, Ill., to increase its fares, proceeded at once to Washington to present a protest against the increased rates before the Interstate Commerce Commission.

Cites New York Decision in St. Louis.—The Civic League of St. Louis, Mo., which has declared that the Public Service Commission exceeded its authority in increasing fares in St. Louis while the city has a contract for 5-cent service, has called the attention of City Counsellor Daves to the order issued by Justice Finch of the New York Supreme Court restraining Public Service Commissioner Nixon from giving New York surface lines relief in higher fares on a similar theory.

Seven Cents in Wilmington.—The Wilmington & Philadelphia Traction Company, Wilmington, Del., has installed 7-cent cash fares on its Wilmington local lines under authority granted by the Wilmington Board of Public Utility Commissioners. The company had asked for an 8-cent fare. Under the commission's ruling metal tokens are sold at the rate of four for 25 cents, and free transfers are given. The higher fare was made necessary by a wage advance of 10 cents an hour made to trainmen some time ago.

Jitneys and Higher Fares.—Addressing the Board of Trade of Abington, Mass., recently, P. F. Sheehan of the Brockton division of the Eastern Massachusetts Street Railway, stated that jitney competition was taking \$4,600 a week from the company's earnings in Brockton, \$1,600 at Whitman and several hundred dollars in other communities. Mr. Sheehan said that lower fares could be put into effect if jitney competition were eliminated, probably 6-cent or 7-cent fares in place of the present 10-cent rate.

Fare Increases in Bay State.—The East Taunton (Mass.) Street Railway has adopted a 7-cent fare on its lines under authority recently granted by the State Public Service Commission. The company had asked for an 8-cent fare. The new rate will remain in effect for three months. The commission has also approved the petition of the Milford & Uxbridge Street

Railway for authority to charge 8-cent fares. The Eastern Massachusetts Street Railway has filed with the commission a supplementary rate between Stone Bridge and the state line under which it proposes to issue five tickets for 35 cents.

Bloomsburg Seven-Cent Fare Stands.—The Public Service Commission of Pennsylvania has dismissed a complaint against charging of a 7-cent fare by the North Branch Transit Company, Bloomsburg. The company, which operates lines between Danville, Berwick, Bloomsburg and Catawissa, some time ago increased fares from 5 cents to 7 cents. Even under the higher rates there was a deficit for the first six months of 1919 of \$3,817. The company has paid no dividend, on its capital stock of \$525,000 and has defaulted on interest on its \$532,000 bond issue since Jan. 1, 1915. It is now in the hands of a receiver.

Traveling Agent Will Investigate Service.—The Monongahela Valley Traction Company, Fairmont, W. Va., has created the position of traveling passenger and express agent and has appointed C. H. Hardesty to the post. His duties will be to travel over the entire system with a view to ascertaining the character of the service. He is to investigate complaints of insufficient or poor service and to recommend improvements. He will also arrange for transportation in connection with conventions and will investigate the company's express service. The traveling agent will have access to all operating records. He will report directly to the general manager.

New Transfer System for Seattle.—The Seattle (Wash.) Municipal Street Railway will put in effect a new system of transfers, which it is believed will save the city about \$500 daily. The new transfers will be about the size of a theater ticket, of a different color for each day of the week, and will be stamped with the hour. To support his claim that the passengers on the municipal lines have been riding too far for a nickel, Thomas F. Murphine, superintendent, recently sent a man out with instructions to see how far he could ride on one fare. Starting at 9 a. m., he was still riding at 4 p. m., without having stopped for lunch. It is said that he could have continued longer.

A Profit to all Merchants Handling Tokens.—Letters announcing the additional delivery of fare tokens before Nov. 1 were received by every merchant in St. Louis, Mo. The merchants were asked whether they would handle the tokens and sell them to the public. As an inducement to the merchants the United Railways promised to supply tokens in lots of fifty at 7 cents each, and not to require any payment until the tokens had been disposed of by the dealer. Consequently any dealer who sells two tokens at the rate set by the Public Service Commission, two for 15 cents or seven for 50 cents, will clear a profit. It is thought by railway officials that this inducement will widen the distribution of the tokens among the merchants.

Another Increase Asked.—The Washington-Virginia Railway, Washington, D. C., which was recently allowed to increase fares on its interurban lines by the Interstate Commerce Commission, has petitioned that body for a still further increase in rates. The commission on Oct. 15 authorized an advance in fares amounting to approximately 10 per cent. The company, which operates lines in the

District of Columbia and Virginia, now asks that the cash fare between Washington and Alexandria, Va., be increased from 15 cents to 20 cents and that rates between other points be increased proportionately. To eliminate delays caused by the payment of cash fares, the company has suggested to the commission that a penalty of 5 cents be imposed on such fares.

Cars Unheated, Coal Saved.—The East St. Louis (Ill.) Railway is sending out all of its cars without heat until the present coal crisis is over. An average of six carloads of coal is consumed at the plant daily and it is hoped to reduce this consumption to four carloads daily by economy. Much of the power used by the company is supplied by the Keokuk Power Company, but it is impossible to secure all that is needed from this source and some must be supplied by the local plants.

Service Soon Over St. Louis Bridge.—The Municipal Bridge Commission of St. Louis, Mo., has decided to place in immediate operation the city-owned cars over the Free Bridge. Director of Public Utilities Hooke has been directed to establish the system. He said it would be in complete operation inside of twenty days. The operation of the line will follow a delay of nearly eighteen months, while the city has been waging a legal fight in the Illinois courts to prevent the city of East St. Louis from collecting an \$18,000 tax on the part of the bridge extending over East St. Louis property. Under the schedule prepared by Chief Engineer Butts of the Bridge Commission it is planned to establish car service over the bridge between 6 a. m. and midnight. There will be no "owl service." The fare will be 5 cents each way for adults and 2 cents for children under twelve years.

Jitney Service Attacked.—James W. Synan, of the Massachusetts Highway Commission, recently addressed an extended letter to the North Adams *Transcript*, pointing out the value of the service recently resumed by the Berkshire Street Railway and stating that no jitney service could be compared with it, figured on any basis of eighteen hours a day and 365 days a year, and usually at a thirty-minute or at most an hour's service between communities. Commissioner Synan declared that by no possibility can jitney and electric railway service be maintained in competition in the Berkshire district, and urged the public to eliminate at once jitney competition with the company in Berkshire County. He stated that if it became necessary to again shut down the Berkshire Street Railway, the county would be set back thirty years in its development.

Ten Cents Asked in Augusta.—The Augusta-Aiken Railway & Electric Corporation of South Carolina, Augusta, Ga., has filed with the Railroad Commission of Georgia a petition for an increase on car fares from 6 cents to 10 cents on its Augusta city lines. The company proposes to sell ten tickets for 75 cents. An increase in power and light rates is also asked. The petition was the answer of the company to the recent complaint of the city of Augusta, filed before the commission, in which the city declared that the rates for light, power and fare in Augusta were varied and haphazard and were not fixed on scientific calculation. In its answer the company admits that in some measure the city's complaint is true, but declares that the present high costs of operation require an increase in fares. A hearing has been set by the commission for Nov. 25.

Personal Mention

W. L. McCloy, Jr., formerly general superintendent of the Philadelphia Company, Pittsburgh, Pa., has been promoted to the position of general manager of the company. Mr. McCloy succeeds Carroll Miller, resigned. He has been connected with the company for many years.

R. L. Warner, formerly vice-president of the United Railways, St. Louis, Mo., has been elected vice-president and treasurer of The North American Company, New York City. Mr. Warner has for twenty years been actively identified with the development and financing of public utility properties and railroads, more particularly in New England and the South.

F. S. Chamberlain, who for the last six years has been district engineer of electric operation for Henry L. Doherty & Company, has been appointed general manager of the Mansfield Public Service & Utility Company, Mansfield, Ohio. Before joining Henry L. Doherty & Company, Mr. Chamberlain was connected with the American Gas & Electric Company.

J. Sigfrid Edstrom, president of the General Electric Company of Sweden, is in this country to attend the International Labor Conference as a delegate of his government. Mr. Edstrom was at one time connected with the General Electric and Westinghouse Companies in this country. He also took an active part in the construction of the tramway systems in Zurich and Göttingen.

James G. Nellis has resigned as manager of the Quincy division of the Eastern Massachusetts Street Railway, Boston, Mass., and will engage in other business. Mr. Nellis joined the company at the time of its recent reorganization. Previous to his appointment as manager of the Quincy division, he was for ten years superintendent of the Amsterdam division of the Fonda, Johnstown & Gloversville Railway, Fonda, N. Y.

Maurice E. McCormick, who resigned last July as assistant general manager of the New Brunswick Power Company, St. John, N. B., has been appointed manager of the Quincy division of the Eastern Massachusetts Street Railway, Boston, Mass. Mr. McCormick succeeds James G. Nellis, whose resignation is noted elsewhere in this column. He was formerly assistant general manager of the Bangor Railway & Electric Company, Bangor, Me. He entered the employ of that company in 1896 as an apprentice.

L. H. Bean, who has been general manager of the Tacoma Railway & Power Company, Tacoma, Wash., for the last nine years, has resigned. Mr. Bean has joined the staff of Dwight P. Robinson & Company, New York City, as a construction engineer. Before becoming connected with the Tacoma Railway & Power Company, a Stone & Webster property, he had represented the latter organization at Baltimore, Seattle and Bellingham, Wash. He has been acting as the chairman of the board of trustees of the Tacoma Employees' Association.

H. Brobeck, who has been appointed superintendent for the Eastern district of the San Francisco-Oakland Terminal Railways, joined the company in 1902, when it was known as the Oakland Traction Company. In 1905 he was transferred to the

Key division as motorman, and in 1906 was appointed inspector on all lines of the Oakland Traction Company. In 1908 he was appointed assistant superintendent of the Key division, which position he filled until 1915, at which time he was appointed chief clerk to George H. Harris, general superintendent.

F. H. Dewey has resigned as president of the New England Investment & Security Company, Worcester, Mass., and its subsidiaries. The electric railway system of which Mr. Dewey was formerly the head includes the Worcester Consolidated Street Railway, the Milford, Attleboro & Woonsocket Street Railroad, the Interstate Consolidated Street Railway, and the Attleboro Branch Railroad. He will retain an interest in the corporations. Mr. Dewey was elected president of the Worcester Consolidated Street Railway in 1898, and of the New England Investment & Security Company in 1915.

Clark V. Wood, president of the Springfield (Mass.) Street Railway and of the New England Investment & Security Company, Worcester, Mass., has been elected president of the Worcester Consolidated Street Railway, a subsidiary of the latter corporation. Mr. Wood has also been chosen president of the Milford, Attleboro & Woonsocket Street Railroad, the Interstate Consolidated Street Railway, and the Attleboro Branch Railroad, all subsidiaries of the New England Investment & Security Company. He succeeds F. H. Dewey, Worcester, who has resigned. Mr. Wood became head of the New England Investment & Security Company last July, following Mr. Dewey's resignation from that office.

Elbert G. Allen, who has been appointed advisory engineer of the Stone & Webster organization, was educated at the Massachusetts Institute of Technology. He received the degree of B. S. in mechanical engineering in 1900 and E. E. in 1901. From 1901 to 1907 he was employed by Stone & Webster on various kinds of engineering work. He was superintendent of construction for Stone & Webster at Dallas, Tex., in 1907 and then returned to the Boston office, where he has since had charge of much of the important steam and electrical work done by the company. In 1918 he was made assistant engineering manager. His new appointment as advisory engineer will leave him free from routine matter so that he can devote himself to consultation and special problems.

Obituary

A. M. Moore, superintendent of equipment of the Georgia Railway & Power Company, Atlanta, Ga., died at his home in Atlanta on Sept. 23 after an illness of several weeks. Mr. Moore, who was fifty years of age at the time of his death, had been connected with the company for many years. He was formerly its master mechanic, and was appointed superintendent of equipment in 1916.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER
SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

Varnished Insulations Show Advance in Price

Increased Costs Send Cotton and Silk Products Up from 10 to 20 Per Cent Under Good Buying

Several kinds of insulation materials increased in price about Nov. 7. The rise of 2 cents a pound on friction tape was individual rather than general, but the expression was not individual that a further rise might be expected before the end of the year. Jobbing houses of electrical supplies are as a rule well supplied with tape, and many will not be in the market for new stocks until the end of the first quarter of the new year.

Varnished cambric in sheet and tape form has advanced in the neighborhood of 10 per cent, with about a 2 point higher rate on the tape because of the additional labor necessary to get it into that form. Cotton in the raw state has advanced to around 40 cents a pound, and this increase plus the added cost of labor to get it woven has been given as the cause for the advance in the finished insulation. White cotton tapes, on the other hand, have not advanced, as far as could be learned.

Silk insulation has taken a much higher jump; in fact, the supply for this purpose is so limited that more often than not it is necessary to get a price according to the amount of stock which can be secured to fill a definite order. The most recent advance on silk tape is that of about 20 per cent on Nov. 7. The silk cloth, varnished, is somewhat lower. Prices are extremely uncertain, however, and likely to increase at any time.

Good Sales Recorded in Portable Track Grinders

Production Is Gradually Catching Up to Normal—Deliveries Are Made in One to Two Weeks

The amount of business being transacted in portable track grinders is good and has been improving right along for several months past. Grinder stocks are in good shape, and are sufficient to meet normal demands for a period of four weeks. Production has fallen behind from a number of different causes, but is gradually catching up and will be sufficient to take care of all demands unless some unforeseen obstacle arises. Recent sales show considerable improvement and the prospects are promising for an increase in sales for the next three months. Sales for the past six months are double those for the corresponding period of last year. The buying appears to be regular, and no advance in prices has been made recently. Furthermore, no advances are looked for this year.

Present stocks are in such shape that deliveries on track grinders can be made in ten days of receipt of order. One company advises that one to three machines are available for immediate delivery. Although large individual orders are scarce, a manufacturer has recently sold six to one company. Manufacturing con-

ditions are good at the present time and no troubles from labor sources are looked for at the present time. With one or two exceptions, railways are meeting their bills a little more promptly than has been the custom in the past year.

Steel Rail Prices May Advance

First Quarter Quotations are Withdrawn by a Large Producer—The Pig Iron Situation Is Unsettled

On the strength of a possible increase in the price of pig iron, at least one large producer is holding back quotations on first and second quarter delivery of standard rail sections.

At the present writing there is no information available to the effect that the steel interests will advance prices, although several large sales of pig and foundry iron have been made at increases of from \$2 to \$3 a ton over the old prices. T-rails and girder rails are holding firm. No present manufacturing conditions are satisfactory and a production close to normal is assured. Good quotations for delivery can be made on certain types of special work, although all orders are subject to mill conditions.

The general trend in rails is upward, and it is believed that on account of heavy steel requirements of the first and later, a congestion will result such as was experienced during the early part of 1918, when unfilled orders ran up as high as 9,500,000 tons. The production of rails, which in 1918 amounted to more than 2,500,000 tons, is expected to show a great increase in 1919. This is on account of the small amount of rails purchased in the past five years. Present indications are that higher prices and longer deliveries than at present may be the rule next year, and that those companies which are able to place their requirements should make every effort to do so now in order to be assured of deliveries later.

Pole-Handling Tool and Supply Prices Higher

Heavy Buying of Peavys, Pikes, Climbers, Pliers, Etc., Reduce Local Stocks—Shipments Good

Advances have just been reported in the price of representative lines of pole-handling equipment and tools used in connection with pole construction. The advance amounted to 20 to 25 per cent and was applied to such equipment as peavys, cant hooks, pikes, etc., and climbers, pliers and kindred tools. Orders have been heavy this fall for construction equipment, and local stocks are low. Nevertheless, manufacturers can make almost immediate shipment from factory stocks.

Pole hardware buying has been particularly heavy, and in some quarters stocks are virtually gone. Shipments which are in transit from manufacturers should soon relieve the local shortage. Factories are shipping in from two to three weeks. Prices show no change but there is an apparent tendency upward before the year closes.

Thirty Days Best Delivery on Snow Plows

Two Months Quoted on Certain Types—Some Fair Sales Made—Old Equipment Being Repaired

The volume of business in snow sweepers and plows has failed so far to come up to the mark set by last year's business or of the previous year. While there have been orders from different companies in Northern and Northeastern states, the majority of railways are not purchasing the additional snow-clearing equipment which they need. A number of large companies have placed inquiries on fairly heavy requirements, and it is expected that some of these will materialize within the next few weeks.

For a limited number of equipments in one of several types, such as a combination nose plow and sweeper or with nose plows or sweeper on both ends, deliveries can be made by the first of the year or shortly thereafter. If prospective purchasers order certain equipment now in stock, delivery in as quick time as thirty days can be made. These are the best delivery dates available, although some manufacturers are quoting delivery of two to three months, and longer. Another large manufacturing company advises that owing to a large amount of work going through the shops, it will be unable to build the sweepers and plows for this year's delivery.

Orders for repair parts on snow sweepers have been light so far this season. Old equipments are being put into shape, but the repairing is of the home-made variety. Some orders for long brooms and for broom materials have been placed, but in small volume.

Davis Steel Wheel Sales Show Improvement

No Price Increases Recently—Sales for First Half Show Slight Decrease—Deliveries Good

Sales of Davis steel wheels for August, September and October show considerable improvement over previous months, although the buying is still of an irregular nature. Sales for the first half of this year, according to reports, are less than for the corresponding period of last year. This period of slackness was naturally expected, however, coming as it did after the heavy war orders were filled.

Prices have not advanced in the past three months, but there is no telling what may be expected during the first quarter on account of advanced quotations on pig iron for future delivery and the present situation in the steel industry. Present reports indicate that the situation is gradually becoming better, and that the end of the trouble may come within the present month.

There is no decline in the raw material market. Manufacturing conditions are good and have not held up deliveries as might be expected. Deliveries at the present time are being made in from six to eight weeks.

Rolling Stock

Sacramento (Cal.) Northern Railroad, has ordered two 60-ton electric locomotives.

Capital Traction Company, Washington, D. C., expects to purchase forty new double-truck cars to cost \$500,000, and to reconstruct and repair its tracks and provide additional power-house equipment, totaling in all an expenditure of approximately \$1,100,000.

Recent Incorporations

San Francisco & Sacramento Railroad, Oakland, Cal.—The San Francisco & Sacramento Railroad has been incorporated as the successor to the Oakland, Antioch & Eastern, the Oakland & Eastern and the San Ramon Valley Railroads. The new company is capitalized at \$5,500,000.

Spotsylvania Railroad, Richmond, Va.—The Spotsylvania Railroad has been chartered to build an electric line three miles long in Spotsylvania County, Va. The officers of the company are: C. B. Lathrop, president; J. D. Patton, Jr., secretary, Joseph Baker, Edward McAuley, Clarence Stutz, E. I. Dunkman, M. Davis and Lewis Durham are directors.

Franchises

Pacific Electric Railway, Los Angeles, Cal.—The City Council of Los Angeles, Cal., has passed an ordinance permitting the Pacific Electric Railway to construct a single-open track upon and across Central Avenue.

Pacific Electric Railway, Los Angeles, Cal.—The City Council of Long Beach, Cal., has passed a franchise ordinance empowering the Pacific Electric Railway to construct double and single tracks adjacent to the Los Angeles County flood-control district in the city of Long Beach.

Stephenville, Tex.—Construction of a railway line from Stephenville to Desdemona, a distance of about 30 miles in the west Texas oil fields, is proposed by a company now being organized by business men of the two towns. The line will be electrified as soon as a power plant and transmission line can be built, but in the meantime the road will be operated as a steam line. Engineers are now in the field making surveys for the line.

Track and Roadway

Pacific Electric Railway, Los Angeles, Cal.—The Pacific Electric Railway has applied to the Railroad Commission of California for authority to construct a second track at grade at three points across the Wilmington-San Pedro Road and across Harbor Boulevard, San Pedro.

Sacramento Northern Railroad, Sacramento, Cal.—The Sacramento Northern Railroad plans to extend its tracks from Sacramento for a distance of five miles down the Sacramento River.

San Francisco, Cal.—The Board of Supervisors of San Francisco has granted John A. Fears a spur track permit to switch electric cars across Mission Street at Twelfth Street.

Connecticut Company, New Haven, Conn.—The Connecticut Company has relaid its tracks from North Main Street, Southington, to Buckland Street, Plainville.

Connecticut Company, New Haven, Conn.—The Connecticut Company has begun laying the rails for its new track across the Plaza, Bridgeport, Conn.

Carolina Beach Electric Railway, Wilmington, Del.—Ground will be broken about Dec. 1 for the construction of the Carolina Beach Electric Railway from Wilmington to Carolina Beach, a distance of 13 miles. The road will be ready for operation before the next summer season. The authorized capital of the company is \$650,000.

Greenview Electric Light & Power Company, Sweetwater, Ill.—The construction of an electric railway in Sweetwater, is contemplated by the Greenview Electric Light & Power Company.

Binghamton (N. Y.) Railway.—The Public Service Commission for the Second District, has issued an order approving construction by William G. Phelps, receiver for the Binghamton Railway, of an extension of the company's Port Dickinson line to the plant of the Hire's Condensed Milk Company in the town of Fenton.

Brooklyn (N. Y.) Rapid Transit Company.—An order has been issued by Transit Construction Commissioner John H. Delaney, directing the receiver of the Brooklyn Rapid Transit Company to proceed with the construction of the last section of the Culver Line, involving the right-of-way from Sheepshead Bay to the Coney Island terminal.

Eastern Massachusetts Street Railway, Boston, Mass.—The Eastern Massachusetts Street Railway is laying new rails on its Maltapan line in Randolph, Mass.

Eastern Massachusetts Street Railway, Boston, Mass.—The Eastern Massachusetts Street Railway plans to relay its tracks in Market Street, Boston.

Eastern Massachusetts Street Railway, Boston, Mass.—The Eastern Massachusetts Street Railway has reconstructed the tracks in Winter Street, Lynn, Mass., at a cost of \$15,000.

Detroit (Mich.) United Railway.—The Detroit United Railway is rerouting its Hamilton line cars preparatory to abandoning its tracks in Ledyard Street and Cass Avenue.

Detroit (Mich.) United Railway.—A delegation of one hundred persons, representing the section of Detroit east of the present Warren Avenue terminus, recently requested the Detroit City Council to make an agreement with the Detroit United Railway whereby the car line proposed for their section of the city could be built without delay.

Northern Ohio Traction Company, Akron, Ohio.—The Northern Ohio Traction & Light Company has accepted a twenty-five-year franchise on the Canton-Massillon road. It must now be approved by the Stark County commissioners and by the property owners along the line.

Cincinnati (Ohio) Traction Company.—Street Railway Director Calkins of Cincinnati, Ohio, has addressed a communication to the City Council asking for an investigation of the engineering and financial feasibility of replacing the pres-

ent double trolley system with the standard single system in connection with the possible adoption of single-truck, one-man cars on certain lines.

Cincinnati (Ohio) Traction Company.—It was decided at a meeting of the Cincinnati Rapid Transit Commission on Oct. 3 that work on the construction of the rapid transit loop should commence on Oct. 15, by turning off the canal waters.

Lake Shore Electric Railway, Cleveland, Ohio.—During the present year the Lake Shore Electric Railway has spent approximately \$225,000 on repairs and extensions to its Lorain city line. Tracks have been extended to the Cromwell steel plant and the main line has been improved. Work on the elimination of the loop at Erie Avenue and Broadway has been completed.

Harrisburg (Pa.) Railways.—The Harrisburg Railways has finished the relaying of its tracks in Second Street between North and Reilly Streets at a cost of \$44,904.

Power Houses, Shops and Buildings

Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.—The Chicago, North Shore & Milwaukee Railroad has leased the two-story building at 209 South Wabash Avenue, Chicago, for use as a passenger waiting room.

Toledo Railways & Light Company, Toledo, Ohio.—The Toledo Railways & Light Company has put off opening its new building at Superior Street and Jefferson Avenue. The structure, which contains nearly two acres of floor space, will be used for offices.

Trade Notes

Joseph H. Towle formerly with the Railway Improvement Company, New York City, severed his connection with this company on Sept. 1. He was formerly with the People's Railway, Dayton, Ohio, and the Springfield (Ohio) Railway. Mr. Towle has now formed a new company with T. A. Calhoun known as Towle & Calhoun, which will be located at Grand Rapids, Mich., and will act as the distributor of the Willys farm light throughout western Michigan.

Belgian Purchasing Agencies.—Co-operative purchasing bureaus have been established in Belgium under the auspices of the Belgian Ministry of Reconstruction. For supplying iron, steel or metal-working equipment, manufacturers should address the Société Co-operative, Association des Vicinaux de Belgique, 32 rue Eloy, Bruxelles, for interviews; Société Co-operative, Federation des Centrales d'Electricité de Belgique, 153 rue Royale, Bruxelles, for power plants, and Société Co-operative, Association des Tramways Electriques des Belgique, 15 Avenue de la Toison d'or, Bruxelles.

Western Electric Company, New York, N. Y., announces that Frank Gill, who started in the telephone business in 1882 and has performed important work in many different countries, has been appointed chief engineer in Europe for the company, J. P. McQuaide, after about twenty years of continuous service at

Philadelphia, has been transferred to Cincinnati as stores manager. F. H. Van Gorder, a power apparatus specialist, has been appointed manager of the Newark store. A. H. Ashford is in charge of company's branch at Jacksonville, Fla.

E. L. Sullivan has been appointed to represent the Green Engineering Company in the Pittsburgh district, including western Pennsylvania, eastern Ohio and western West Virginia. Mr. Sullivan has been a special representative for the McDonough Regulator Company for the past ten years in Chicago and Pittsburgh. He has devoted all of his time to special investigations pertaining to the securing of more efficient boiler and furnace operation. Mr. Sullivan will maintain the company's present offices at 2545 Oliver Building, Pittsburgh, where he will serve in all matters pertaining to the sale of Green chain-grate stokers, sealflex arches, steam-jet ash conveyors, cast-iron ash tanks and replacements for the same.

S. A. Redding, mechanical and electrical engineer, who has been with the Georgia Railway & Power Company, Atlanta, Ga., for fifteen and a half years, has established a special technical service in South American countries and will make commercial, industrial and financial reports. As general superintendent of the Georgia Railway & Power Company, he had general supervision over the steam and water power production, transmission lines, and all operating and maintenance in the electrical department as well as all engineering and construction. He will represent the following companies: Ohio Brass Company, Delta-Star Electric Company, Crouse-Hinds Company, Cheatham Electric Switching Device Company, Nachod Signal Company, G & W Electric Specialty Company and the Columbia Machine & Malleable Iron Company.

E. M. Cutting, formerly Western manager of the Edison Storage Battery Company, has been appointed manager of the railway department with headquarters at the factory, Orange, N. J. In 1888 he commenced working for the Southern Pacific Company in its signal department and in 1897 was promoted to be supervisor of the Western division of the road. In 1905 he received charge of the electric lighting of the passenger-train cars of the system, still retaining the position of Signal Supervisor. Three years later he was appointed engineer of train lighting, heating and ventilation of the entire system. He resigned from the Southern Pacific Company Dec. 31, 1912, to become manager of the newly created Western branch of the Edison Storage Battery Company.

Economy Electric Devices Company, Chicago, Ill., announces the recent sale of Economy power-saving watt-hour meters to an electric railway company in Arequipa, Peru, South America, to the Eastern Texas Electric Company, Beaumont, Tex.; to the Eastern Massachusetts Street Railway, Boston, Mass., and to the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill. The twenty-eight meters furnished the Eastern Massachusetts Street Railway included special features designed to serve in measuring energy transmitted between the various parts of the d. c. distribution system. The power department similarly with other departments of the company has been divided into twelve units and these are tied together through the Economy meters.

John Kelly, who for a number of years was New York district manager of the Edison Storage Battery Company, has been appointed general sales manager of the Edison Storage Battery Company, with headquarters at Orange, N. J. This promotion for Mr. Kelly follows closely upon his previous promotion, on July 1 of this year, to the position of assistant general sales manager. Mr. Kelly brings to his new position the experience of a long and varied career in the storage-battery, electric vehicle and accessory business. For nine and one-half years he was district manager of the New York office of the Edison Company. Before that he had been a salesman for the Westinghouse Storage Battery Company, for the Swineheart Tire & Rubber Company, for the Firestone Tire & Rubber Company and for the New York Edison Company.

Electrolytic Oxy-Hydrogen Laboratories, Inc., New York City, announce the formation of a sales and manufacturing company under the name of the Electro-labs Company. This will give them an opportunity to increase their organization to meet the increasing demand of their business. Electrolytic Oxy-Hydrogen Laboratories, Inc., will continue in charge of the laboratories and maintain a technical supervision over the work of the new company. The general offices and works of both companies have been moved from Dayton, Ohio, into larger quarters at 2635 Penn Avenue, Pittsburgh, Pa. The facilities for production of the new plant will be many times greater than the old plant and will make possible even better deliveries than in the past. The general sales offices are being continued at 15 William Street, New York City, and branch sales offices have been opened in Morris Building, Philadelphia, and the Merchants' Exchange Building, San Francisco. I. H. Levin continues in charge of technical and research work and D. J. Tonkonogy in general charge of sales.

New Advertising Literature

R. V. Hubbell, Bridgeport, Conn.: Circular No. 184 on its reflectors.

W. N. Matthews & Brothers, St. Louis, Mo.: A mailing folder on its Holdfast lamp guard.

Dictograph Products Corporation, New York, N. Y.: An illustrated folder on office telephones.

Vaile-Kimes Company, Dayton, Ohio: Catalog F on electrically operated water supply systems.

Blaw-Knox Company, Pittsburgh, Pa.: A folder about its single-line clam shell automatic buckets.

Brenkert Light Projection Company, Detroit, Mich.: Folder on its "Crescent B" spot floodlamp.

Allis-Chalmers Manufacturing Company, Milwaukee, Wis.: Bulletin No. 1104 on "Steam Turbine Blading."

M. W. Dunton Company, Providence, R. I.: Fourth edition of "Soldering Kinks," a 116-page booklet.

Cutler-Hammer Manufacturing Company, Milwaukee, Wis.: Booklet "J" describing its rectangular magnets.

Cutler-Hammer Manufacturing Company, Milwaukee, Wis.: Booklet on "Electrical Operation of Gate Valves."

Bailey Meter Company, Cleveland, Ohio: Bulletin No. 30 on "Fluid Meters for Low Pressure Gas and Air."

National Carbon Company, Inc., Cleveland, Ohio: Brush Bulletins 11 and 12 dealing with carbon brush setting and friction.

Thompson Electric Company, Cleveland, O.: Pamphlet "How to Make Reflectors Reflect" on safety disconnecting hangers.

United Smelting & Aluminum Company, New Haven, Conn.: A 150-page book on "Side Lights on Aluminum and Non-Ferrous Metals."

Jeffrey Manufacturing Company, Columbus, Ohio: Bulletin No. 273 supplementing catalog No. 244 and covering Jeffrey standard bucket elevators.

Toledo Pipe Threading Machine Company, Toledo, Ohio: An illustrated circular about its portable motor for operating pipe threading and cutting tools.

Trumbull Electric Manufacturing Company, Plainville, Conn.: Circular No. 46 on its "Circle T" externally operated engine switches and meter protective trim.

Herman H. Sticht & Company, New York, N. Y.: A leaflet on "Standco" hand tachoscopes and "Standco" hand tachometers.

J. H. Williams & Company, Brooklyn, N. Y.: Seventeenth edition catalog, on its Vulcan, Agrippa and Falcon brands of drop forgings and drop forged tools.

British Aluminum Company, W. Toronto, Can.: A 12-page pamphlet on the use of aluminum sheet, describing its manufacture, finishing and applications.

Bennage Company, Cleveland, Ohio: A bulletin describing the Sepco system made by the Steam Electric Products Company of generating steam for heating devices, by electricity.

Stow Manufacturing Company, Binghamton, N. Y.: Bulletins 103 on motor-driven tools of every type and description. Bulletin 104, portable tools, drills and flexible shaft grinders.

Condit Electrical Manufacturing Company, South Boston, Mass.: Bulletin No. 414-2 on type E-4 oil switches and circuit breakers whose maximum ampere capacity has recently been increased to 800.

Under-Feed Stoker Company of America, Detroit, Mich.: A thirty-one page booklet containing much interesting information regarding coal from various geographical sections of the country.

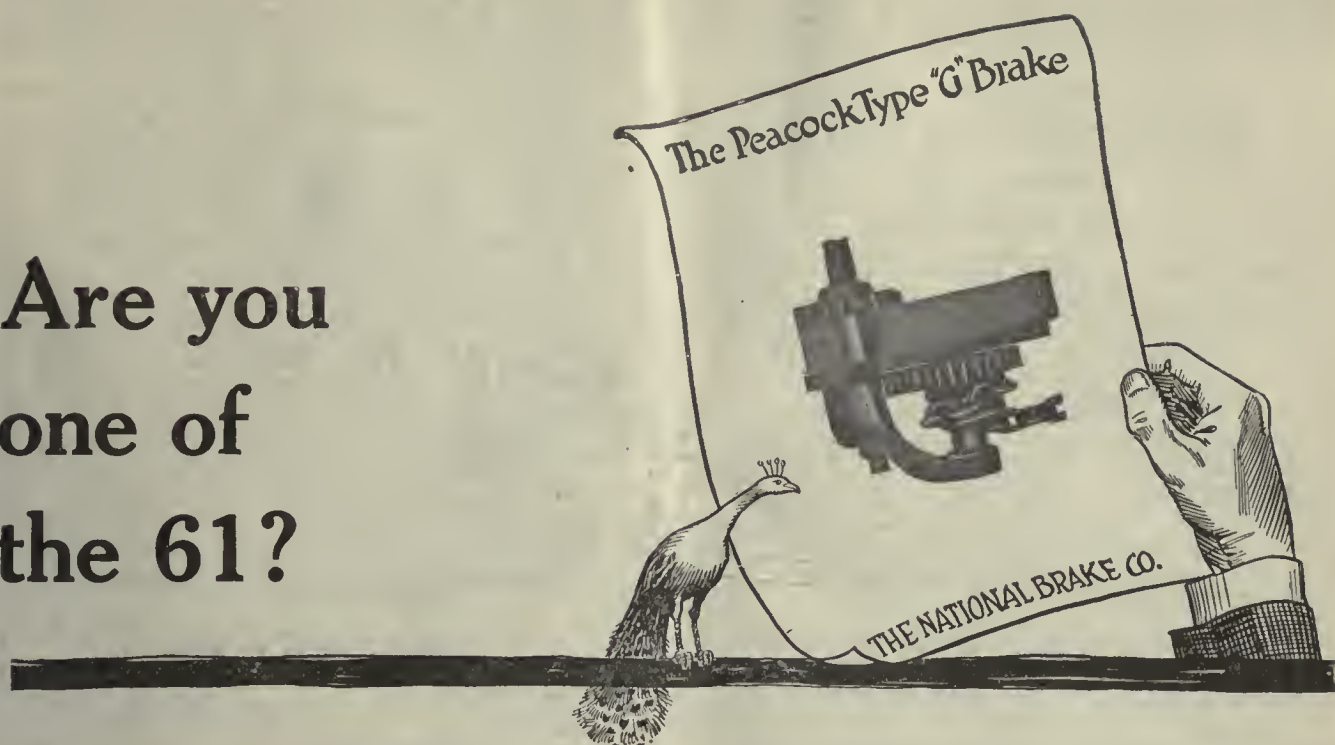
Belden Manufacturing Company, Chicago, Ill.: Bulletin No. 1208 on "Beldenmold," descriptive of material, terms and conditions covering quotations, orders and production of synthetic molded insulation.

Allis-Chalmers Manufacturing Company, Milwaukee, Wis.: Bulletin No. 1091 on its "Type OB-4 Governor" for automatic regulation of pressure for air brake equipment and stationary or portable air compressors.

General Electric Company, Schenectady, N. Y.: The Geco resistor for incandescent headlights for 500 to 600 volt circuits, giving lamp data, weight, dimensions, description of mounting, and diagram of connections.

Metal & Thermit Corporation, New York, N. Y.: A folder entitled "How Thermit Cured My Diseased Neck," illustrating a repair on the 16-in. diameter neck of a large roughing-mill pinion used by the Universal Rolling Mill Company, Bridgeville, Pa.

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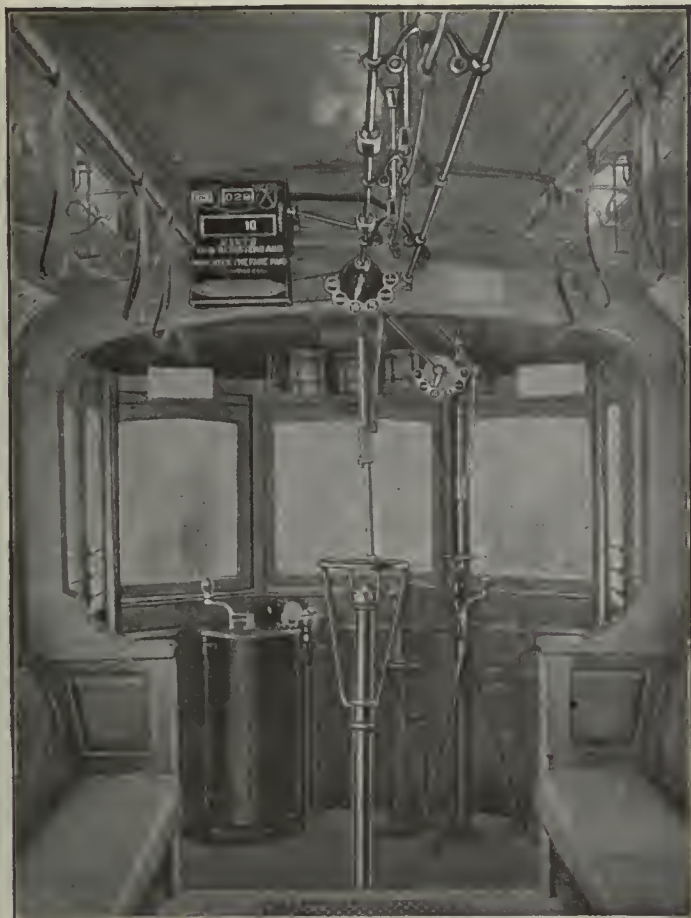
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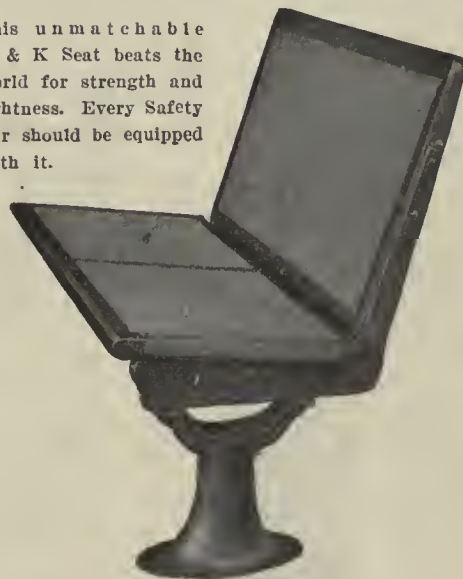
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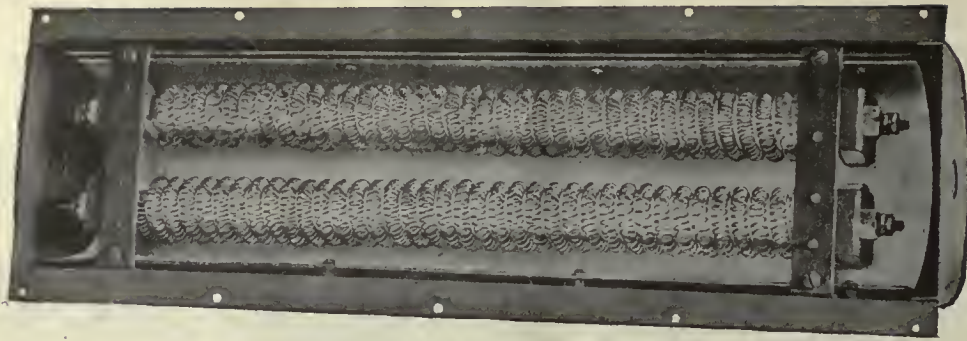
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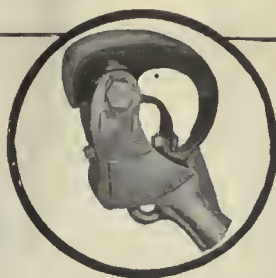
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For every 100 car miles lost when you are short of cars, you are out \$25 to \$40 earnings.

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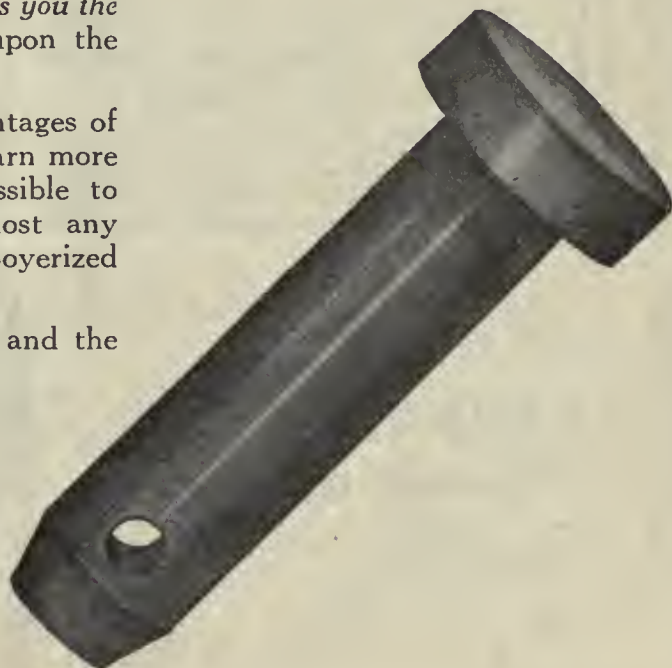
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Don't adopt it as your motto.
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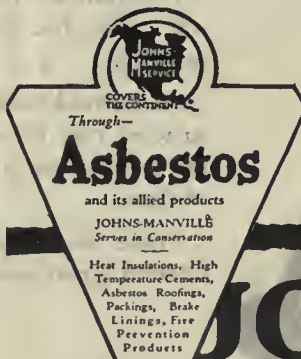
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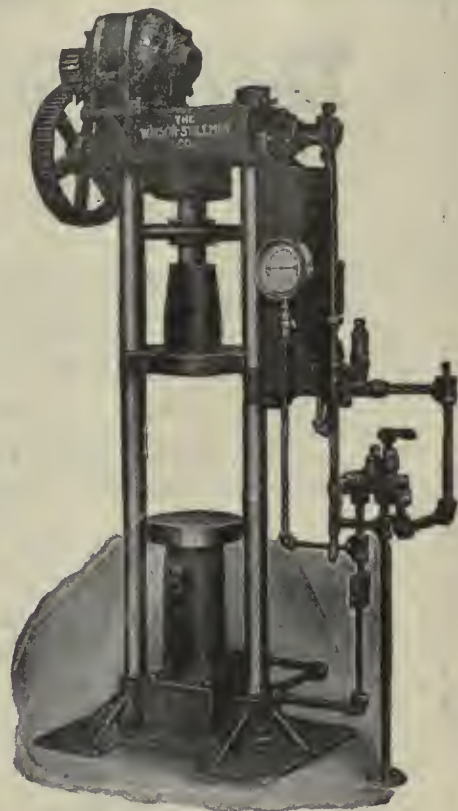
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James M. Castle, Inc.

812 Lincoln Bldg., Philadelphia, Pa.

*Manufacturers and Distributors
of Fire-Extinguishing Apparatus.*

There is a good story about Kipling

A friend sent him a copy of a magazine with the advertising pages torn out. Kipling wrote back: "Send me the ads next time. I can write stories myself."

This reminds us of a concern in Pennsylvania that subscribes to four McGraw-Hill papers, just for the *Searchlight* ads.

Do you read the *Searchlight Section* of this paper each week? If not, you may be passing up a great opportunity. These ads are up-to-the-minute news of the industry this paper covers—a true barometer of business conditions; some of them may be published just for *your* benefit. Be sure and look them over *every week*. Start *now!*

Read the Searchlight Section in this issue

Roebbling



Wire Rope and Wire

John A. Roebbling's Sons
Company

TRENTON, NEW JERSEY.

New York Boston Chicago Philadelphia Pittsburgh Cleveland
Atlanta San Francisco Los Angeles Seattle Portland, Ore.

A Trolley Wheel is a High-Speed Tool



V-K Oilless
Trolley
Wheel.

Non-Arcing
Trolley Harp

with a car speed of 20 miles per hour a six-inch trolley wheel is running at about 1500 revolutions per minute.

That is *one* reason why the consistency of the metal in a trolley wheel is a matter of so much importance.

More-Jones Wheels are *tough* but never too hard, permitting the effects of an occasional unpreventable arc to be smoothed out.

To put a *hard* wheel against your trolley wire grinds the wire almost like a fine emery wheel.

Consideration of the speed at which a trolley wheel runs, however, also shows the necessity for using a harp that will hold the wheel *always* in proper position.

In a V-K Non-Arcing Harp the wheel stays put. The lock-nut, gripping device prevents any "play" of the wheel, and consequently eliminates arcing, due to worn pinholes.

There are a lot of other advantages in V-K Oilless Wheels and Non-Arcing Harps. It will pay you to learn all about them.

More-Jones Brass & Metal Co.

St. Louis, Mo., U. S. A.

TICKETS

You Can Get a Better Check on Fares

with paper tickets than with the more expensive metal tickets. Besides, they are easier to handle.

Our tickets embody accuracy, quality and service and the price is reasonable.

We will furnish a ticket exactly like your sample.

If you are anticipating a fare change let us consult with you on your ticket problem.

Quotations? Send the sample.

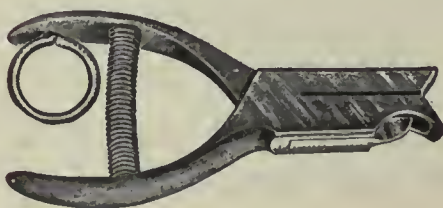
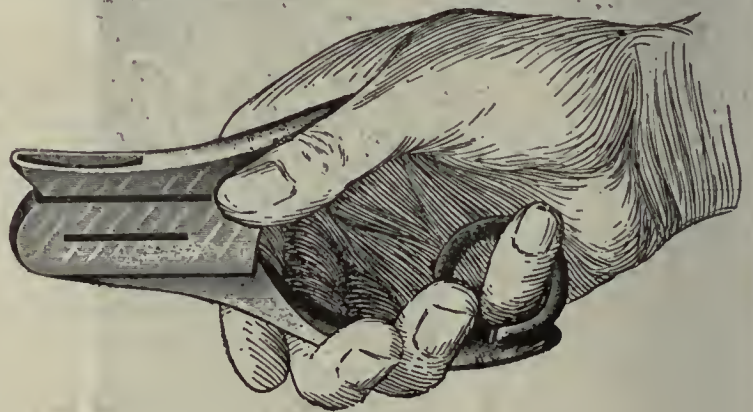
Weldon-Williams & Lick
FORT SMITH, ARK.



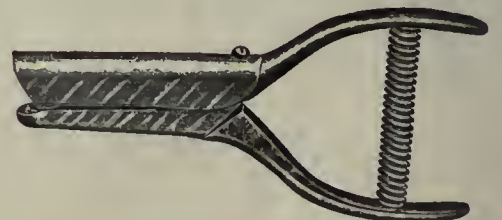
For Quality B-V Punches

The Dies Are Tool Steel

100 Varieties



Bonney
Vehslage
Tool Co.
Newark, N. J.



A Big Time Saver!

Hensley Fool-Proof Trolley Harps

Much time is often lost by the conductor in trying to put the trolley wheel back on the wire due to the fact that the wire catches in the harp or along the side of the wheel.

This is not possible when the Hensley Fool-Proof harp is used because it is impossible for the wire to hit anywhere but in the correct slot in the trolley wheel.

The conductor can be sure that so long as the pole does not jump up on release the wheel is on the wire in its proper position.

Write for details.

Hensley Trolley & Mfg. Co., Detroit, Mich.

You'll find them nice people to do business with

Here
is the
fool-
proof-
feature



The Right Amount in the Right Place

You may only want to dump half or one-third or even a twentieth of the load, and you want to dump it in a certain place—not all over the track.

This can be done quickly and with no cost for labor by

DIFFERENTIAL Electric Dumping Cars

Differential Cars are built of steel with small individual operating motor for each car. This enables one man—the motorman—to dump an entire load with safety and in record time.

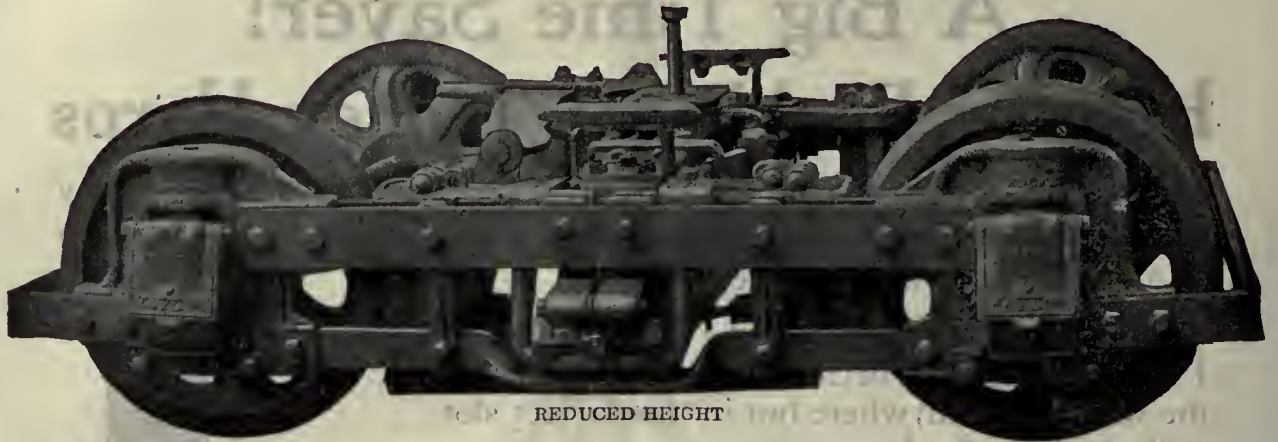
The load is dumped *away* from the track, eliminating any interruption of passenger schedules. You'll need some differential cars to reduce maintenance costs. Write for further particulars.

Write for details and be convinced.

DIFFERENTIAL CAR CO., INC.
141 Broadway, New York

R. H.

TAYLOR REDUCED HEIGHT TRUCK



REDUCED HEIGHT

TAYLOR R. H. TRUCK

Mounted on 26-in. Wheels with Springs Over Journal Boxes.
Designed to Mount Centre and End Entrance Cars Low Down.

SWING MOTION AND FULL ELLIPTIC SPRINGS

Wheel Base 5 ft. 2 in. For Car
Bodies weighing 16,000 to 22,000 lb.
Motors Inside Hung.

EASY
RIDING

Journals $3\frac{3}{4}$ x 7 M. C. B. Type.
Height from Rail to Body Bolster,
 $22\frac{3}{4}$ in. Brakes Inside Hung.

TAYLOR ELECTRIC TRUCK CO., TROY, N.Y.

SPECIFICATIONS ON REQUEST

Established 1892

SEND FOR PORTFOLIO

KERITE

BE
GUIDED

by facts, not theories —
by performance records, not claims —
by experience, not prophecy. Every
consideration points straight to KERITE
for permanently satisfactory and economical service.

KERITE INSULATED WIRE & CABLE COMPANY

General Offices, 30 Church Street, New York
Western Office, Peoples Gas Building, Chicago



"NEVER CREEP"

First Cost is Last Cost

THERE'S no upkeep cost
connected with the NEVER-
CREEP—its installation
doesn't mean an annual "re-
pair" expense.

When the NEVER-CREEP is buried, its
cost ceases.

Unlike ordinary anchors, wet weather and
seasonable heavy strains do not affect it in
the least—it continues to serve you well and
good under conditions that would mean havoc
to old-fashioned anchors.

The more you know about anchors the quicker
you'll recognize NEVER-CREEP as a revolu-
tion in its field.

ASK YOUR JOBBER

CHANCE COMPANY

Dept. J

Centralia, Mo.

Aluminum Company of America

Manufacturers of

ALUMINUM

Electrical Conductors

All-Aluminum and Steel Reinforced
for

Transmission Lines
Railway and Industrial Feeders
Signal Circuits
Railway Catenary Construction
Bus Bars

also

Ingots—Rods—Rivets—Extruded Shapes
Sheet Tubing

also

Aluminum Solders and Flux
Flux and Wire for Autogenous Welding

GENERAL SALES OFFICE

Oliver Bldg., Pittsburgh, Pa. U. S. A.

Canada: Northern Aluminum Co., Ltd., Toronto.

Latin America: Aluminum Co. of South America, Pittsburgh, Pa.

England: Northern Aluminum Co., Ltd., London.

STEEL POLES FOR EVERY POLE PURPOSE



Cut shows Bates Steel Poles in use by the Royal Swedish States Rys., electrifying the steam railroads of Sweden. Lapland, located about 75 miles south of the Arctic Circle, in the land of the Midnight Sun, the most northerly railroad of the world.

Bates Steel Poles are becoming universally popular world wide. Repeat orders testify their general suitability for every Pole purpose.

Telegraph, Telephone, Power Transmission, Electric Trolley Lines, Electric Light, Etc.

Highest class and most up-to-date steel pole equipment in the world.

Our STEEL POLE TREATISE tells the story. Ask for it.

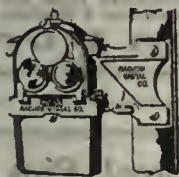
About 2,000 tons of steel constantly on hand; hence prompt shipments.

Tubular Steel Poles cost 50 per cent. more than Bates Steel Poles, yet Bates Poles are 100 per cent. stronger—will last 100 per cent. longer, cover a much broader range of adaptability and are much more artistic than Tubular Poles. Ask us to certify these facts.

BATES EXPANDED STEEL TRUSS COMPANY

208 LaSalle Street

Chicago, Ill., U. S. A.



NACHOD SIGNALS

on that piece of
single track that's
been worrying you

will show when the block is clear, tell the motorman when he has set the stop signal at the other end, show to following cars that the block is occupied, and give each an indication that it is protected in entering; meanwhile holding stop signals against opposing movements until the block is clear again.

Nachod signals save time, they never sleep, and are ever on the alert to prevent accidents.

Nachod Spells Safety

in signals, bells and headway recorders

NACHOD SIGNAL CO., Inc.

Louisville, Ky.

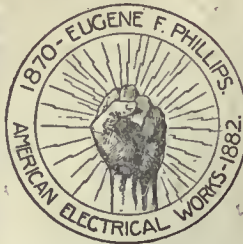
American Rail Bonds

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UNITED STATES
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Send for new
Rail Bond book

American Steel & Wire
Company

CHICAGO
NEW YORK



**WEATHERPROOF WIRE
AND CABLE**
**PAPER INSULATED
UNDERGROUND CABLE**
(Single, Duplex and Three Phase)
TROLLEY WIRE
(Round, Grooved or Figure 8)
**BARE COPPER WIRES
AND CABLES**
MAGNET WIRE
(Cotton or Asbestos)

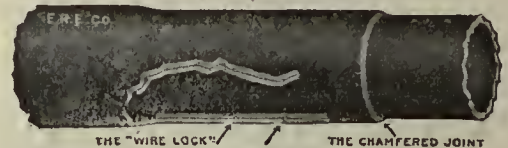
Americanite Rubber Covered Wire Galvanized Iron and Steel
Incandescent Lamp Cord Wire and Strand

AMERICAN ELECTRICAL WORKS

Phillipsdale, R. I.

Boston, 176 Federal; Chicago, 112 W. Adams; Cincinnati, Traction Bldg.;
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ELRECO TUBULAR POLES



COMBINE

Lowest Cost **Lightest Weight**
Least Maintenance **Greatest Adaptability**

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.

CINCINNATI, OHIO

New York City, 30 Church Street

THE LINDSLEY BROTHERS CO.

Western "Good Poles Quick" Northern

Quick Shipments Rooms 832-834, 72 West Adams St. Butt Treating
from our CHICAGO, ILL. Open Tank and
Minneapolis "Hot and Cold"
Yard Spokane — St. Louis Processes

Transmission Line and Special Crossing
Structures, Catenary Bridges

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ARCHBOLD-BRADY CO.

Engineers & Contractors SYRACUSE, N. Y.



For every type of
modern service.

PAGE & HILL CO.

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WHITE MARBLE LIME CO., (Cedar Dept., Manistique, Mich.

WESTERN CEDAR POLES

Grinnell, Ia. - B. J. CARNEY & Co. - Spokane, Wn.

1729 McCormick Bldg. Chicago

Quick Service Yard & Butt Treating Plant
in Minneapolis

RAMAPO

Automatic Safety and Automatic Return Switch Stands for Passing
Sidings. Tee Rail Special Work for Interurban Lines and Private
Rights of Way. Manganese Construction a Specialty.

Ramapo Iron Works

HILLBURN, NEW YORK
Plants at Hillburn, N.Y. and Niagara Falls, N.Y. New York Office, 30 Church Street

"NATIONAL"

TUBULAR STEEL POLES

Ask for "NATIONAL" Bulletin No. 14, "NATIONAL" Tubular Steel Poles
NATIONAL TUBE COMPANY PITTSBURGH, PA.

Peirce Forged Steel Pins
with Drawn Sheet Steel Thimbles

Your best insurance against insulator breakage

Hubbard & Company,

PITTSBURGH, PA.

EUREKA PRODUCTS

Commutators, Trolley Wheels, Sheet Trolley Wheels, Trolley
Bars, Line Material, Controller Fingers, Brush Holders, etc.

We make quality goods.

THE EUREKA COMPANY, North East, Pa.

Carbide Lights and Oxy-Acetylene Cutting
and Welding Torches and Apparatus

THE ALEXANDER MILBURN COMPANY-BALTIMORE, MD

Chapman Automatic Signals

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SPECIFY

THE TERRY TURBINE

For Driving Your Auxiliaries

TERRY STEAM TURBINE CO.

Hartford, Conn

BARBOUR-STOCKWELL CO.205 Broadway, Cambridgeport, Mass.
Established 1858

Manufacturers of

Special Work for Street Railways

Frogs, Crossings, Switches and Mates

Turnouts and Cross Connections

Kerwin Portable Crossovers

Balkwill Articulated Cast Manganese Crossings

ESTIMATES PROMPTLY FURNISHED

HIGHEST QUALITY**TRACK SPECIAL WORK****WE MAKE THIS GRADE ONLY****CLEVELAND FROG & CROSSING CO.**
CLEVELAND; OHIO**DO YOU WANT**Light, Economical, Non - Corrodible
Stair-Nosing delivered from stock? If
so, send us your requirements now for
our**ALUMINIUM****THE BRITISH ALUMINIUM CO., LTD.,**

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165 Broadway, New York City

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WATER TUBE STEAM BOILERS**Steam Superheaters****Mechanical Stokers**

Works: BARBERTON, OHIO—BAYONNE, N. J.

BRANCH OFFICES:ATLANTA, Candler Building
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TUCSON, ARIZONA, Santa Rita Hotel Bldg.**Dependable Track Work
for Electric Railways**Frogs, Switches, Switch Stands,
Crossings, Special Track Work,
Machine and Drop Forgings,
Pressed Steel and Hammer
Work. Foundry for Manganese
Steel Castings and special fa-
cilities for heat treating. Let
us bid on your requirements.**ST. LOUIS FROG & SWITCH CO.**
ST. LOUIS, MO.**SPECIAL TRACK WORK**SWITCHES, FROGS AND CROSSINGS.
ANTI-KICKING BIG HEEL
SWITCHES.TRACK WORK
OF EVERY DESCRIPTION.
HARD CENTER CONSTRUCTION.
Balkwill Articulated Cast Manganese Crossings**New York Switch & Crossing Co.**
Hoboken, N. J.

Vicious BLOWOUTS IMPOSSIBLE

Violent blowouts are a distinct menace and should not be tolerated.

The delicately proportioned and accurately calibrated Link of the "Union" Renewable Fuse simply disappears, without flash or violence, when a short circuit occurs.

Consequently there is no danger or burning of the tube.

And so substantially are the other elements of this scientifically-designed fuse constructed that it stands up against blowouts indefinitely—a big saving where blowouts are frequent.

"Union" Fuses are guaranteed to give entire satisfaction by a concern that has never shirked an honorable obligation or broken a promise during its 30 years' existence.

Sold by all Electrical Dealers.

Shall we send booklet?

Chicago Fuse Mfg. Co.

Chicago

New York

'UNION' RENEWABLE AND NON-RENEWABLE FUSES

TRACTIONS POWER GEARS OF ROLLING STOCK PROTECTED WITH



ASK US FOR
FACTS



BAKELITE-DILECTO

The fields of usefulness for Bakelite-Dilecto are many and varied because of its superior merit over materials heretofore available in sheets, tubes or rods.

The exceptional qualities of Bakelite-Dilecto are satisfying electric railways all over the country. Investigate.

THE CONTINENTAL FIBRE CO.

Newark, Delaware

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Pittsburgh Office—301 Fifth Ave. San Francisco Office—
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EST. 1855 **American** INC. 1915

**INSULATING
MACHINERY
COMPANY**

REG. U.S. PAT. OFF.

PHILADELPHIA
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"American" Electric Railway Automatic Signals.
RECLAIMING MACHINES } for recovering
INSULATING MACHINES } insulated wire



FOSTER SUPERHEATERS

Greatly Increase
Efficiency and Power of
Steam Turbines.
POWER SPECIALTY CO.
Trinity Building, 111 Broadway
NEW YORK

CONDENSERS, SPRAY NOZZLES,
VALVES, OIL BURNING EQUIPMENT,
FEED WATER HEATERS, INJECTORS,
Distillers, Oil Coolers, Chemical Equipment

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WATER

PURIFICATION, SYSTEMS
SOFTENING & FILTRATION
FOR BOILER FEED AND
ALL INDUSTRIAL USES

WM.B.SCAIFE & SONS CO. PITTSBURGH, PA.

brute strength!

BRUTE Strength, scientifically applied, without bulk or clumsiness that's Williams' "Vulcan" Drop-Forged "C" Clamps.

All Williams' Clamps are built with a purpose for every clamping purpose—maximum capacity 18".

They are made for Heavy, Medium, Light and Tool-makers' Service by drop-forgers with nearly half a century's experience behind them. They are all guaranteed.

Ask for a copy of our new catalog.

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Williams' Drop-Forged Clamps



HOPE Brand for best results

Webbings and Tapes made from the best raw materials—made with the most up-to-date machinery and most reasonably priced! That's what you get in Hope Products.

Send for Sample.



HOPE WEBBING CO.

Providence, R. I.

396 Broadway, New York

YALE

19D

—a guide to profit for everyone who has loads to be handled.

You need this new Yale Chain Block book for the clear, complete, concise information it contains on every angle of hoisting equipment.

It gives you complete data on:

Yale Spur-Gear Chain Blocks
Yale Screw-Gear Chain Blocks
Yale Differential Chain Blocks
Yale Electric Wire Rope Hoist
Yale Electric Chain Hoist
"Brown Hoist" Trolleys—Cranes

The Yale hoisting equipment described in Catalog 19D speeds up production—with increased SAFETY to the operator. The unusually complete maintenance data is of special interest to present users.

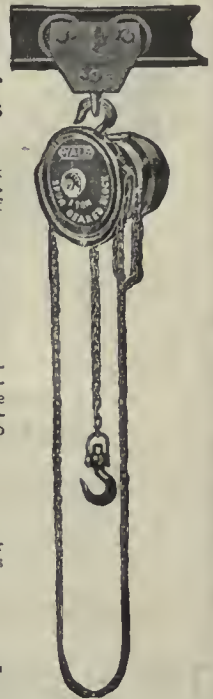
**"From Hook-to-Hook
a Line-of-Steel"**

Let us send you your copy.

Ask your machinery supply house or wire for catalog on Yale Chain Blocks and Electric Hoists.

For a Factory Locking Equipment
Use a Yale Master-Key System

THE YALE & TOWNE MFG. CO.
9 EAST 40TH ST., NEW YORK CITY



NILES-BEMENT-POND CO.

111 BROADWAY, NEW YORK

MACHINE TOOLS

For Electric Railway Repair Shops

Axle Lathes
Wheel Presses
Shapers, Drills
Slotters, Planers
Steam Hammers
Electric Travelling
Cranes

Send
for
Catalogs



I. T. E. Circuit Breakers

for heavy street railway work are the best obtainable. Write for New Complete Catalogue.



"Everything in Insulation"

Mica
Vulcanized Fibre
Varnished Cloth
Insulating Tapes
Waxes
Asphalts
Compounds
Insulating Varnish

The above are only a few of our products. Write us for anything in this line you may require.

MITCHELL-RAND MFG CO.
103 John St., New York City

Armature and Field Coils—Armatures Rewound



Commutators
Refilled
Prompt Service

THE KING-COIL MFG. CO., CLEVELAND, OHIO

A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

Cameron Electrical Mfg. Co., Ansonia, Connecticut



TAPE

For overhead and underground work

Retains its flexibility.
Will not dry out.
High in insulating qualities.
The most durable tape made.

Send for bulletins on P & B insulating and preservative specialties.

The Standard Paint Company

Woolworth Building, New York
Boston Chicago

THE ONLY SCREW HOLES IN THE WORLD

You drive the screw holes with a hammer in any material.
The screw holes are made for wood screws or machine screws to fit all sizes of screws. The head is removed and you leave a permanent screw hole.

The Stine Screw Holes Co.
Manufacturers
WATERBURY, CONN., U. S. A.
DEPARTMENT 13

Once a Screw Hole, Always a Screw Hole

The Biggest Little Thing in the World

Some of the Reasons Why Screw Holes Will Be Bought and Used and Not Become Dead Stock for Anyone

- 1-They can be used without damage to receiving material.
- 2-They enable you to standardize to wood or machine screws in all material.
- 3-They are made of brass and will not rust under atmospheric or moisture conditions.
- 4-ECONOMY-They save more time value than the holes cost.
- 5-You get them for nothing and are paid for using them when you count time saved.
- 6-Screw holes have been needed ever since the first screw was used.
- 7-Special tools are NOT needed in using them in any material.
- 8-They can be used in any place a screw can be used.
- 9-By using screw holes, screws can be used in many places, and in many materials where it is impossible to use screws without them.
- 10-These are the only ready-made screw holes in the world.
- 11-No special screws are needed. These screw holes fit any wood screw or machine screw now in stock.
- 12-They make the neatest possible job in any material.
- 13-Every store where screws are sold must carry them in stock, because the line of screws is not complete without screw holes for them.
- 14-Every shop and factory where screws are used must also have these screw holes to fit the screws.
- 15-They are endorsed by all dealers in screws and by all users of screws.
- 16-Screw holes are entirely new and the world supply is yet to be furnished.
- 17-This is a progressive Old World of ours, and every active person in it must adopt all improved methods, and all new articles that will help him keep in the front line of progress.
- 18-Be among the first to stock up in screw holes if you are a dealer in screws.
- 19-Be among the first to install screw holes in your shop or factory, as you begin to save money soon as you use them.
- 20-In spite of the high cost of brass, screw holes are yet cheap.
- 21-We are letting the world know that screw holes can now be secured, by means of extensive advertising in all the principal Trade Journals that have the largest circulation among dealers in screws as well as users of screws.
- 22-Do not let your customer ask you for screw holes before you have them in stock. BE A LIVE WIRE.
- 23-They make everlasting holes in any material.
- 24-They mean "Plug-No-More" screw holes.
- 25-They are the result of Necessity being The Mother of Invention.
- 26-Anyone who can drive a nail can use screw holes.
- 27-Send for a sample and convince yourself.
- 28-Mechanics who see them say, "What do you think of that?"
- 29-In fact there are NO REASONS why screw holes should NOT be used.

Each of these reasons are enough to sell Screw Holes. There are many other reasons.
Write at once for our handsome Color Card showing screw holes in various materials which will be sent on request, together with samples and price list.

Tapes, Webbing and Sleeving



Office: 300 Brook St., Pawtucket, R. I.

REPRESENTATIVES:

Chicago—E. P. Bartlett & Co., 15 No. Jefferson St.
Cleveland, Ohio—Mueller Electric Co., 423 High Ave., S. E.

LET TOLEDO CRANES LIFT YOUR LOAD



Get in touch with us

TOLEDO BRIDGE & CRANE CO.
TOLEDO, OHIO

New York Office, 52 Broadway
Philadelphia Office, 2013 Market St.
Pittsburgh Office, 203 Oliver Bldg.

Cleveland Office, 725 Citizens Bldg.
Chicago Office, 549 Washington Bldg.
San Francisco Office, Rialto Bldg.

Full power with
High or Lower Adjustment
Many emergencies requiring a powerful jack present a difficulty in bringing the jack to bear on the load. The
Buckeye Emergency
Jack No. 239 Special

saves time, strength and trouble. The many positions to which it is adjustable easily solve perplexing lifting problems. Full details in our catalog. Write for it.

**The Buckeye
Jack Mfg. Co.**

Alliance, Ohio



The Big Three
D & W Fuses, Deltabeston Wire
D & W Oil Fuse Cutouts
D & W Fuse Co., Providence, R. I.

Simplex Jacks
for
Railroads-Contractors-Industries
Automobiles-Pole Pulling and Ordnance
Templeton, Kenly & Co., Ltd.
Established 1899
London Chicago Paris



FORD TRIBLOC

For doing things quicker—
more efficiently and with less hand labor, the Ford Tribloc is used in a thousand lines of industry, in this country and abroad. The Ford Tribloc is a hand chain hoist. Dependability and durability are built into it. In capacities of $\frac{1}{2}$ to 40 tons—guaranteed in writing for 5 years.

Ford Chain Block & Mfg. Co.
Second & Diamond Sts., Philadelphia, Pa.
2166-D



“American Brand” Badges Punches and Buttons for Better Service

Electric Railway employees equipped with “American Brand” sundries will testify for their durability.

Service has been our aim for the past fifty years. You get it in “American Brand” products and in their delivery.

Improve your service now. Write for particulars and prices.

AMERICAN RAILWAY SUPPLY CO.
134-136 CHARLES STREET, NEW YORK



The Zone System of Fares

Is successfully collected with the aid of
**CLEVELAND
FARE BOXES**
Ask Us for Particulars

The Cleveland Fare Box Co.
Cleveland, Ohio
Canadian Branch: Preston, Ont.

WE CAN CUT YOUR COST OF HEATING CURRENT

Write for THERMOSTATIC CONTROL INFORMATION

GOLD

ELECTRIC HEATERS Cut Installation and Maintenance Charge.
VENTILATORS Also Ventilate in Stormy Weather.
THERMOSTATS Save Current.
ORIGINATED the use of NON-CORROSIVE Wire for Electric Car Heaters.
ORIGINATED The Ventilated Coil Support.

LET US FIGURE ON YOUR NEXT REQUIREMENTS
Gold Car Heating & Lighting Co., 17 Battery Pl., New York



Car Heating and Ventilation

is one of the winter problems that you must settle without delay. We can show you how to take care of both with one equipment. Now is the time to get your cars ready for next winter. Write for details.

The Peter Smith Heater Company
1725 Mt. Elliott Ave., Detroit, Mich.

“It Behooves You to Hooverize Your Motormen”

We can help you
Write to
The Arthur Power-Saving Recorder Co.
2nd National Bank Bldg., New Haven, Conn.

Heating and Ventilating

Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost

The Cooper Heater Company
Carlisle, Pa.

An 800% Increase

YOU may be contemplating an installation of BP heat treated gearing. Go right ahead with it, because you're safe. Since 1913 our BP heat treated gear sales have increased 800%. In that time not one replacement has been necessary to make good our guarantee covering it.

R. D. NUTTALL CO.
PITTSBURGH, PA.



Nuttall Gears

EVERY GEAR REGISTERED

BRAKE SHOES STANDARDIZE

Our Standard Patterns
Reinforced Brake Shoes
Conservé Material, La-
bor, Time and Money—
Ask us.

**American Brake Shoe &
Foundry Co.**
30 Church Street, New York

332 S. Michigan Ave., Chicago, Ill. Chattanooga, Tenn.



Our new K-35-36 Triggerlock Reversible Controller Finger is the best ever made. You cannot afford to be without them if you use these controllers.

They have our standard reversible and interchangeable tips.

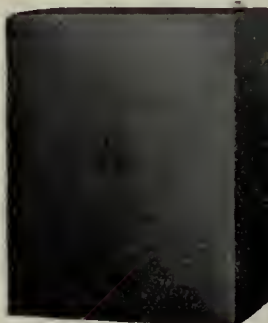
Our reverse fingers for these controllers are great time and money savers.

Order some, and after testing them you would never use any other kind.

A sample finger will be sent if you write for it of any type.

Triggerlock Reversible Controller Finger

814-18 Bath Ave., Niagara Falls, N. Y.
557 King St. West, Toronto, Canada



*We specialize in the
manufacture of*

HIGH GRADE

BRUSHES for RAILWAY MOTORS

and all other types of electrical equipment. All brushes especially designed for the service in which they are to operate and satisfactory performance guaranteed.

Send for specification blanks

THE UNITED STATES GRAPHITE COMPANY
Saginaw, Michigan, U. S. A.

Branch Offices: New York, Pittsburgh, Philadelphia, Birmingham,
Chicago, St. Louis, Denver, San Francisco



The Economy Railway Meter

Induces Power Saving.
Our power-saving bulletins
will vitally interest you right
now. Ask for them.



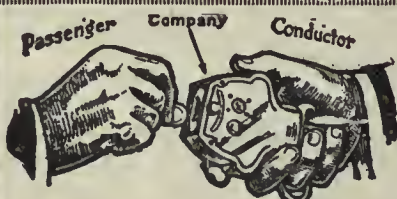
Economy Electric Devices Co., Chicago

DREW MOTORMEN'S SAFETY MIRRORS

Eliminate Accidents

Send for catalogue No. 18

DREW ELECTRIC & MFG. CO.
1016 E. Michigan St., Indianapolis, Ind.



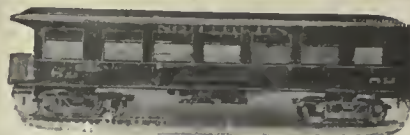
**Direct
Automatic
Registration**
By the
Passenger
Rooke Automatic
Register Co.
Providence, R. I.



Use them in your terminals—
**PEREY TURNSTILES
or PASSIMETERS**

Faster than the ticket seller

Perey Manufacturing Co., Inc.
30 Church Street, New York City

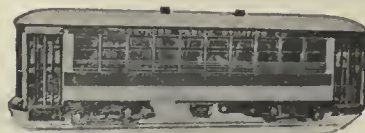


PERLEY A. THOMAS CAR WORKS

Manufacturer of Cars
and Car Materials

Cars of all types from one-man to large
interurban

HIGH POINT, N. C.



SASHES, DOORS
INTERIOR FINISH
VESTIBULES AND FRAMING

CURTAINS, VENTILATORS
SASH AND DOOR TRIMMINGS
DOOR AND STEP MECHANISM

"Reproduction
of Ajax Car
Brass that ran
336,000 miles
before wearing
too thin for fur-
ther use"

*This Car Brass was
sent to us by a large
Electric Railway System*

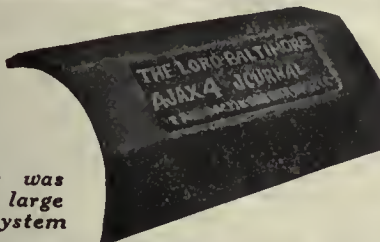
We do not guarantee all our Car Brasses to wear as long—but
this Time Record points to why, after thirty years' experience,
Ajax Metals stand at the top.
Ajax Car Brasses, Check Plates and Babbitt Metals help to
increase your dividends.
They are metals that give good service.

THE AJAX METAL COMPANY

Established 1880

Main Office and Works:
PHILADELPHIA, PA.

Southern Plant:
BIRMINGHAM, ALA.



The Kalamazoo Trolley Wheels

have always been made of en-
tirely new metal, which accounts
for their long life WITHOUT
INJURY TO THE WIRE. Do
not be misled by statements of
large mileage, because a wheel
that will run too long will dam-
age the wire. If our catalogue
does not show the style you
need, write us—the LARGEST
EXCLUSIVE TROLLEY WHEEL
MAKERS IN THE WORLD.



THE STAR BRASS WORKS

KALAMAZOO, MICH., U. S. A.

Bayonet Detachable Trolley Harps



save time, labor, wheels,
wire, power, money; keep
your cars on schedule
time, prevent accidents.
Satisfaction guaranteed.
BAYONET TROLLEY
HARP CO.
Springfield, O., U. S. A.

Railroad and Tram Car Specialties

New inventions developed, perfected
and worked for the English market

Messrs. G. D. Peters & Co., Ltd.

Windsor Works, Slough (Bucks), Eng.

VAN DORN COUPLERS

are made for every condition and requirement. M.C.
B. Pin and Link, Car and Air, in all sizes and types.

VAN DORN COUPLER CO.

2325 So. Paulina St., Chicago, Ill.



See the Crank of the

CREAGHEAD DESTINATION SIGN

By means of it, conductor or motorman
can change sign without leaving platform.
All that has to be done is to turn the
crank. Better investigate.

CREAGHEAD ENGINEERING CO., CINCINNATI, O.

Bound Brook Trolley Wheel Bushings Give Longer and Better Service

THERE are more Bound Brook (Oil-less) Trolley Wheel Bushings in use
today than all other makes combined. That is because Bound Brook Bush-
ings, by virtue of their construction, invariably outlast all other types.

All Genuine Graphited Oil-less Bushings have
always been made of Bound Brook, U. S. A.

BOUND BROOK OIL-LESS BEARING COMPANY
Bound Brook, New Jersey Detroit Office: 1723 Ford Bldg.

The "Nycap-Exide" Battery

for

STORAGE BATTERY STREET CARS

THE ELECTRIC STORAGE BATTERY CO
PHILADELPHIA

RAILWAY UTILITY COMPANY

Sole Manufacturers

"HONEYCOMB" AND "ROUND JET" VENTILATORS
for Monitor and Arch Roof Cars, and all classes of buildings;
also ELECTRIC THERMOMETER CONTROL
of Car Temperatures.

141-151 WEST 22d ST. Write for
Chicago, Ill. Catalogue

1328 BROADWAY
New York, N. Y.

IRVING SAFSTEP

(PATENTED)

REG. U.S. PAT. OFF.

ABSOLUTELY NON-SLIPPING ALWAYS

Write for
Catalog 2A28

IRVING IRON WORKS CO.
LONG ISLAND CITY, N. Y., U. S. A.

SEARCHLIGHT SECTION

Ads Set in Uniform Style

(Solid in one paragraph, without display)

THREE CENTS A WORD, minimum charge 50 cents an insertion, payable in advance, less 10 per cent. if one payment is made in advance for four continuous insertions—for advertisements under:

Positions Wanted
Evening Work
Wanted

Vacation Work Wanted
Salesman Wants Con-
nections

FIVE CENTS A WORD, minimum charge \$1.50 an insertion, for advertisement under:

Agencies Wanted
Agents Wanted
Business Opportunities
Desk Room for Rent
Educational
Employment Agencies
Desk Room Wanted
Foreign Business
Miscellaneous for Sale, for Rent or Want Ads.

Positions Vacant
Partner Wanted
Representations Wanted
Salesmen Wanted
Patents for Sale
Plants for Sale
Sub-Contracts Wanted
Work Wanted

THIRTY CENTS A LINE, minimum five lines, for all undisplayed advertisements set with a paragraph for each item or tabulated.

THREE DOLLARS AND SIXTY CENTS AN INCH for advertisements for bids (Official Proposals).

ADVERTISING RATES FOR ELECTRIC RAILWAY JOURNAL

Ads Set in Display Type

(Individual space, within border rules)

Space for these advertisements is sold by the inch. Each page contains 30 inches. The rate per inch is based on the total number of inches to be used—that is, the number of inches the advertisement is to occupy multiplied by the number of insertions it is to receive. For instance, a 2-inch advertisement in 2 issues earns the 4-inch rate of \$2.00 an inch. A 1-inch space for 4 issues, or a 4-inch space in one issue, also earn the 4-inch rate.

Schedule of Rates

1 to 3 in., \$3.00 an in. 15 to 26 in., \$2.70 an in.
4 to 7 in., 2.90 an in. 27 to 49 in., 2.60 an in.
8 to 14 in., 2.80 an in. 50 to 99 in., 2.55 an in.

Rates for larger space furnished on request.

In Replying to Ads

DO NOT ENCLOSE original testimonials or anything that you may want returned. State your experience and qualification in as concise and neat a manner as possible and enclose copies of your testimonials.

BE CAREFUL TO PUT ON ENVELOPE, when answering any "blind" ad, the box number in the ad, the name of the paper, and also the local address of office to which reply is sent:

36th St., at 10th Ave., New York
935 Real Estate Trust Bldg., Philadelphia
533 Leader-News Bldg., Cleveland
1570 Old Colony Bldg., Chicago
501 Rialto Bldg., San Francisco

When Writing Copy

ALLOW FIVE WORDS for the address, if replies are to a box number in care of any of our offices. There is no extra charge for forwarding replies.

TO SIGN YOUR NAME and address to your advertisement begets the confidence of the reader and facilitates receiving replies. You can, however, obviate delay in receiving answers by signing your ad. only with initials (your own or others), care of your home, your office or a post-office box number in your city.

POSITIONS VACANT

EMPLOYMENT

POSITIONS WANTED

POSITIONS VACANT

WANTED by a road operating 60 cars. One day and one night foreman. One car painter. Two A-1 car wireman. Ten overhaulers for trucks and motors. One man for air brakes. One trouble man for H. L. control. Steady work. Address P-519, Elec. Ry. Journal, Phila.

POSITIONS WANTED

MAN, 35 years old, University Engineering Graduate, living on the West Coast, who has for the past eight years represented a manufacturing concern selling direct to the electric, logging, and steam railroads, wishes to make a new connection, after the first of next year. Would prefer to work on salary and commission. Minimum \$5000 per year. PW-517, Elec. Ry. Journal, Rialto Bldg., San Francisco.

SUPERINTENDENT with 17 years of experience in both maintenance and operation of city and interurban lines, desires position with larger property, present employers as reference. Address PW-512, Elec. Ry. Journal, Chicago.

Get your Wants
into the Searchlight

EMPLOYERS

Send us your inquiries for men of technical training and experience. We are obtaining employment for soldiers, sailors and marines released from the service.

Re-Employment Bureau of New York City for Soldiers, Sailors and Marines, 505 Pearl Street, north of Municipal Building, Professional Section, Worth 9250.

TROLLEY WIRE

30,000 lb. each 2/o also 3/o bare round hard drawn. First class.

BRACKETS

750 Flexible Pole Brackets, Ohio Brass Co., Cat. No. 9066, Class MLM, Type B, 10 ft. arm, 1½ in. tubing. First Class.

ZELNICKER IN ST. LOUIS

We are the Nation's Market Place for Railway, Power Plant, Contractors' and Mining Equipment and Machinery, also Tanks, Pipe, Piling, etc.

Be sure and get Bulletin No. 270. Its 60 pages will save you much time and real money.

FOR SALE

4 Wason Paye Cars

28 ft. over corner posts
Standard O-36 Trucks
2 Gen. Elec. No. 87—60 hp.
Motors K-36 Control

Splendid Condition

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

RAILS

15,000 TONS—NEW and RELAYERS
NEW—12 lb., 16 lb., 20 lb., 25 lb., 30 lb.,
40 lb., 60 lb., 70 lb., 75 lb., 80 lb.,
85 lb., 90 lb.
RELAYERS—30 lb., 35 lb., 40 lb., 45 lb.,
50 lb., 60 lb., 70 lb., 80 lb., 85 lb.,
90 lb., 100 lb.

Fastenings, New Bolts, Nuts and Spikes, New Frogs, Switches, Crossings and all accessories. Carload and less carload inquiries and orders a specialty. Ralls cut to lengths for structural purposes. Attractive prices. Immediate shipments from stock.

L. B. FOSTER COMPANY
General Office:
Park Building, Pittsburgh, Pa.

Tribune Bldg., 154 Nassau St., New York
N. Y.

FOR SALE

1—48-in. Niles Car Wheel
BORING MACHINE
in good condition.



WORRYLESS ELECTRICAL REPAIRS

On all kinds and sizes A.C. or D.C. motors and generators, starters, welders, controllers, or anything electrical. Quick shipment from stock material, of coil commutators—shafts—bearings, etc. Remember our initials stand for our product.

CAREFUL ACCURATE
CLEVELAND ARMATURE WORKS, Inc.

EST. 1895

4732-4-8 ST. CLAIR AVE., CLEVELAND

INC. 1918

When you want

Men

Put your advertising
for them on the same
basis as other publicity

If you want competent and efficient assistants, experienced in the field served by this journal, you will naturally find such men among our readers—which include the keenest and most progressive men in the industry.

Get in touch with a number of these men and select the one that is best suited for your needs.

Only \$1.50 for 30 words

HYMAN MICHAELS COMPANY

Peoples Gas Bldg., Chicago, Ill.

New and Relaying Rails. Iron and Steel Scrap.

Plants at East Chicago, Ind.

Plant and office—Adelaide and Bulwer Ave., St. Louis, Mo.

Plant at Broadway and Humboldt, St. Louis, Mo.

CARS FOR SALE

- 2—McKean Gaso-Electric Cars.
- 12—Differential 20-yd. Cars.
- 6—Gasoline Passenger Cars.
- 50—Freight Cars.
- 12—Electric Sets.

Get our List and Prices.

J. F. DONAHOO CO., Birmingham, Ala.

FOR SALE

2 Second-hand L-4 CONTROLLERS
in First-Class Condition
25 Grade M, 24 Tooth G. E.
Company PINIONS

ROCHESTER & SYRACUSE RAILROAD COMPANY, Inc.
SYRACUSE, N. Y. J. H. HICKEY, Purchasing Agent



Armature Coil Taping Machine

Saves Time,
Labor and Money

A boy can tape 40
coils for Westing-
house 12A Arma-
ture in an hour.
Further particulars
gladly furnished.

Geo. M. Griswold Machine Co.
New Haven, Conn.

AXLES FOR SALE

56—rough-turned Steel Forged Axles,
8 1/2" diameter, 5" x 9" journal, 7' 8"
over all. New Stock.

EDW. F. TERRY MFG. CO.
Grand Central Terminal - New York City

The Searchlight Advertising in This Paper

is read by men whose success depends upon thorough knowledge of means to an end—whether it be the securing of a good second-hand piece of apparatus at a moderate price, or an expert employee.

THE BEST PROOF

of this is the variety of this journal's Searchlight ads. Without a constant and appreciable demand for such machinery or services, by its readers, the market place which these advertisements represent could not exist for any length of time.

Are you using the Searchlight Section?



TURBINE



- 1—500-kw. Westg. Horizontal, 3-ph., 60-cy., 870-v. (can be rewound for any standard voltage), 3600 r. p. m., with or without condensing equipment.

FREQUENCY CHANGER

- 1—600-kw. Allis-Chsl. 300 r. p. m., 3-ph., 60-cy., 2300-v. and 3-ph., 25-cy., 6600-v., complete with direct connected exciter, panelboards and rheostats.

ROTARY CONVERTERS

- 1—500-kw. Westinghouse Rotary Converter, 6-ph., 600-v. D. C., 430-v. A. C., 800 r. p. m.
- 1—300-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A. C., 575-v. D. C., 600 r. p. m.
- 1—150-kw. Westinghouse Rotary Converter, 2 or 3-ph., 60-cy., 250-v. D. C., 720 r. p. m.

ARCHER & BALDWIN, INC.

114-118 Liberty St., New York, N. Y.
Telephone 437-4338 Rector

ROTARY CONVERTERS

Immediate Delivery from Stock

25-CYCLE, 550-VOLTS D. C.

- 1—300 KW. National, type RT, 3 ph., 550 volts D.C., 545 amps. D.C., 330 volts A.C., 526 amps. A.C., 8 pole, 500 RPM.
- 1—250 KW. Gen. Elec., type TC, form A, 3 ph., 4 pole, 550 volts D.C., 455 amps. D.C., 350 volts A.C., 750 RPM., also A.C. & D.C. panels complete with instruments.

60-CYCLE, 600-VOLTS D. C.

- 1—400 KW. Gen. Elec., type HC, form P, 6 phase, 8 pole, 600 volts D.C., 667 amps. D.C., 430 volts A.C., 900 RPM., with switchboard and necessary instruments.

MACGOVERN & COMPANY, Inc.

114 Liberty Street, New York, N. Y.
Pittsburgh Office, 498 Union Arcade Building
St. Louis, Mo.—215 N. Twelfth St.
Montreal, Que.—255 Beaver Hall Hill

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with
Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car

Collier, Inc., Barron G.
Air Rectifiers
Holden & White, Inc.
Ammeters
Weston Elec'l Instrument Co.
Anchors, Guy
Electric Service Supplies Co.
Chance Co., The
Holden & White, Inc.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & M. Co.
Automobiles and Buses
Brill Co., The J. G.
White Co., The
Axle Straighteners
Columbia M. W. & M. I. Co.
Axles
Bemis Car Truck Co.
Brill Co., The J. G.
National Railway Appliance Co.
St. Louis Car Co.
Standard Steel Works Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.
Babbitt Metal
Ajax Metal Co.
Babbitting Devices
Columbia M. W. & M. I. Co.
Badges and Buttons
American Railway Supply Co.
Electric Service Supplies Co.
International Register Co., The
Bankers and Brokers
Coal & Iron National Bank.
Batteries, Dry
Johns-Manville Co., H. W.
Batteries, Storage
Electric Storage Battery Co.
Johns-Manville Co., H. W.
Bearings and Bearing Metals
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
More-Jones Brass & M. Co.
St. Louis Car Co.
Taylor Elec. Truck Co.
Westinghouse Elec. & M. Co.
Bearings, Center and Roller Side
Holden & White, Inc.
Bearings, Oil-less, Graphite, Bronze and Wood
Bound Brook Oil-less Bearing Co.
Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.
Benders, Rail
Niles-Bement-Pond Co.
Watson-Stillman Co.
Zeinicker Supply Company, Inc., Walter A.
Boiler Coverings
Johns-Manville Co., H. W.
Boiler Tubes
National Tube Co.
Boilers
Bahcock & Wilcox Co.
Bond Testers
American Steel & Wire Co.
Bonding Apparatus
Electric Railway Improvement Co.
Ohio Brass Co.
Bonding Tools
American Steel & Wire Co.
Electric Service Supplies Co.
Ohio Brass Co.
Bonds, Rail
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & M. Co.
Boring Tools, Car Wheel
Niles-Bement-Pond Co.
Brackets and Cross Arms.
(See also Poles, Ties, Posts, Piling and Lum-ber.)
American Bridge Co.
Allis-Chalmers Mfg. Co.
Bates Expanded Steel Truss Co.
Creaghead Engrg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.

Hubbard & Co.
Lindsley Bros. Co.
Ohio Brass Co.
Brake Adjusters
Holden & White, Inc.
Westinghouse E. & M. Co.
Brake Shoes
American Brake S. & Fdy. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
Taylor Elec. Truck Co.
Wheel Truing Brakeshoe Co.
Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Br. Westinghouse Elec. & Mfg. Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Holden & White, Inc.
National Brake Co.
St. Louis Car Co.
Safety Car Devices Co.
Taylor Elec. Truck Co.
Westinghouse Trac. Brake Co.
Bridges and Buildings
American Bridge Co.
Thompson Starrett Co.
Brooms, Track, Steel or Batian
Zeinicker Supply Company, Inc., Walter A.
Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
United States Graphite Co.
Westinghouse Elec. & M. Co.
Brushes, Graphite
United States Graphite Co.
Brush Holders
Anderson Mfg. Co., A. & J. M.
Eureka Co.
Bunkers, Coal
American Bridge Co.
Bushings, Case-Hardened Manganese
Bemis Car Truck Co.
Bushings, Graphite and Wooden
Bound Brook Oil-less Bearing Co.
Bushings, Trolley Wheel
Ives Co., The H. B.
Cars, Dump
Differential Car Co.
Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc., see those Headings.)
Car Trimmings. (For Crutches, Doors, Seats, etc., see those Headings.)
Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
Thomas Perley A.
St. Louis Car Co.
Wason Mfg. Co.
Cars, Second Hand
Electric Equipment Co.
Cars, Self-Propelled
Br. Westinghouse Elec. & Mfg. Co.
Co.
Electric Storage Battery Co.
General Electric Co.
Castings, Brass, Composit-ion, or Copper
Ajax Metal Co.
Anderson M. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & M. Co.
Castings, Gray Iron and Steel
American Bridge Co.
American Steel Foundries
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
Standard Steel Works Co.
Castings, Malleable and Brass
American Brake S. & Fdy. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Catchers and Retrievers, Trolley

Electric Service Supplies Co.
Holden & White, Inc.
Ohio Brass Co.
Wood Co., C. N.
Ceiling Car
Pantasote Co.
Checks, Employees
American Railway Supply Co.
Circuit Breakers
Cutter Co., The
General Electric Co.
Westinghouse Elec. & M. Co.
Clamps and Connectors, for Wires and Cables
Anderson Mfg. Co., A. & J. M.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Eureka Co., The
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.
Cleaners & Scrapers, Track. (See also Snow-Plows, Sweepers and Brooms.)
Brill Co., The J. G.
Ohio Brass Co.
Clusters & Sockets
General Electric Co.
Coal and Ash Handling. (See Conveying and Hoisting Machinery.)
Coil Handling and Winding Machines
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Coils, Armature and Field
Cleveland Armature Works
Columbia M. W. & M. I. Co.
D & W Fusc Co.
General Electric Co.
Independent Lamp & Wire Co.
King-Coil Mfg. Co.
Westinghouse Elec. & Mfg. Co.
Coils, Choke & Kieking
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Coin-Counting Machines
Electric Service Supplies Co.
International Register Co.
Commutator Slotters
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Wood Co., C. N.
Commutator Truing Devices
General Electric Co.
Commutators or Parts
Cameron Elec'l Mfg. Co.
Cleveland Armature Works
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
King-Coil Mfg. Co.
Westinghouse Elec. & M. Co.
Compressors, Air
Allis-Chalmers Mfg. Co.
Chicago Pneumatic Tool Co.
General Electric Co.
Westinghouse Traction Brake Co.
Condensers
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Conduits, Underground
Standard Underground Cable Co.
Connectors, Solderless
Westinghouse Elec. & Mfg. Co.
Contracting Engineers
Thompson-Starrett Co.
Construction, Industrial
Thompson-Starrett Co.
Controller Fingers
Eureka Co., The
Controller Regulators
Electric Service Supplies Co.
Controllers or Parts
Allis-Chalmers Mfg. Co.
Br. Westinghouse Elec. & Mfg. Co.
Columbia M. W. & M. I. Co.
Eureka Co., The
General Electric Co.
Johns-Manville Co., H. W.
Triggerlock Reversible Controller Finger
Westinghouse Elec. & M. Co.
Controlling Systems
General Electric Co.
Westinghouse Elec. & M. Co.

Converters, Rotary

Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Conveyors, Coal and Ash
Green Eng. Co.
Conveying and Hoisting Machinery
American Bridge Co.
Columbia M. W. & M. I. Co.
Green Eng'g Co.
Cord, Bell, Trolley, Register, Etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Roebling's Sons Co., John A.
Samson Cordage Works
Cord Connectors and Couplers
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., C. N.
Couplers, Car
Brill Co., The J. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Trac. Brake Co.
Cranes. (See also Hoists.)
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.
Toledo Bridge & Crane Co., The
Crescenting. (See Wood Pres-ervatives.)
Cross Arms. (See Brackets.)
Crossing Foundations
International Steel Tie Co.
Crossing Signals. (See Signals, Crossings.)
Crossings, Track. (See Track, Special Work.)
Crushers, Rock
Allis-Chalmers Mfg. Co.
Culverts
Armco Iron Culvert & Flume Mfrs. Assn.
Curtains and Curtain Fix-tures
Brill Co., The J. G.
Electric Service Supplies Co.
Pantasote Co.
St. Louis Car Co.
Cutting Apparatus Oxy-Acetylene
Milburn Co., The Alex.
Dealers' Machinery
Archer & Baldwin
Cleveland Armature Wks.
Electric Equipment Co.
Foster Co., L. B.
Griswold Machine Co., Geo. M.
Hyman Michaels Co.
MacGovern & Co., Inc.
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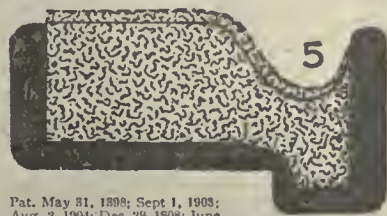
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Measuring Testing.)

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Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.

Holden & White, Inc.
Railway Utility Co.
Smith Heater Co., Peter

Ticket Choppers and De-
stroyers
Electric Service Supplies Co.

Tickets and Transfers
American Railway Supply Co.
Weldon, Williams & Lick

Ties, Mechanical
Dayton Mechanical Tie Co.
Ties and Tie Rods, Steel
American Bridge Co.

Barbour-Stockwell Co.
International Steel Tie Co.
Ties, Wood. (See **Poles,**
Ties, etc.)

Tool Steel
Carnegie Steel Co.

Tools, Track and Miscel-
laneous
Columbia M. W. & M. I. Co.

Electric Service Supplies Co.
Railway Track-work Co.

Tools, Thread Cutting
Williams Co., The J. H.

Torches, Acetylene. (See
Cutting Apparatus, Oxy-
Acetylene.)

Towers and Transmission
Structures
American Bridge Co.

Archbold-Brady Co.
Bates Expanded Steel Truss Co.
Westinghouse Elec. & M. Co.

Track, Special Work
Barbour-Stockwell Co.
Cleveland Frog & Crossing Co.

Columbia M. W. & M. I. Co.
New York Switch & Crossing Co.
Ramapo Iron Works

St. Louis Frog & Switch Co.
Transfers. (See **Tickets.**)

Transfer Issuing Machines
Ohmer Fare Register Co.

Transfer Tables
American Bridge Co.
Archbold-Brady Co.

Transformers
Allis-Chalmers Mfg. Co.
General Electric Co.

Westinghouse Elec. & M. Co.
Treads, Safety Stair Car Step
American Mason Safety Tread

Co.
Universal Safety Tread Co.

Trolley Bases
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.

General Electric Co.
More-Jones Brass & M. Co.
National Railway Appliance Co.

Nuttall Co., R. D.
Ohio Brass Co.

Trolley Shoes
Holden & White, Inc.
Miller Trolley Shoe Co.

Trolley Wire
American Steel & Wire Co.
Roebling's Sons Co., J. A.

Rome Wire Co.
Trolleys and Trolley
Systems
Ford Chain Block & Mfg. Co.

Trucks, Auto
White Co., The

Trucks, Car
American Steel Foundries
Bemis Car Truck Co.

Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Taylor Elec. Truck Co.
Tabling, Steel
National Tube Co.

Turbines, Steam

Allis-Chalmers Mfg. Co.
General Electric Co.
Terry Steam Turbine Co.

Westinghouse Elec. & M. Co.
Turbines, Water
Allis-Chalmers Mfg. Co.

Turnstiles
Percy Mfg. Co., Inc.

Vacuum Impregnation
Allis-Chalmers Mfg. Co.

Valves
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Varnishes. (See **Paints, etc.**)
Ventilators, Car
Brill Co., The J. G.

Holden & White, Inc.
National Railway Appliance Co.
Railway Utility Co.

St. Louis Car Co.
Vises, Pipe
Williams Co., The J. H.

Volt Meters. (See **Instru-**
ments.)

Washers
Bound Brook Oil-less Gearing

Co.
Water Softening and Par-
lyfing Systems
Scaife & Sons Co., Wm. B.

Wattmeters
Weston Elec'l Instrument Co.

Welders, Portable Electric
Electric Railway Improvement

Co.
Welding Processes and Ap-
paratus
Electric Railway Improvement

Co.
General Electric Mfg. Co.
Metal & Thermit Corp.

Milburn Co., The Alex.
National Railway Appliance Co.
Westinghouse Elec. & M. Co.

Welding, Steel
Indianapolis Switch & Frog Co.

Wheel Grinders
Wheel Truing Brake Shoe Co.

Wheel Guards. (See **Fenders**
and Wheel Guards.)

Wheels, Car, Cast Iron
Assn. of Mfrs. of Chilled Car

Wheels
American Steel & Wire Co.

Bemis Car Truck Co.
Wheels, Car. (Steel and
Steel Tired.)

American Steel Foundries
Bemis Car Truck Co.
Standard Steel Works Co.

Wheels, Trolley
Anderson M. Co., A. & J. M.

Bayonet Trolley Harp Co.
Bound Brook Oil-less Bearing

Co.
Columbia M. W. & M. I. Co.

Electric Railway Equipment Co.
Electric Service Supplies Co.
Eureka Co.

General Electric Co.
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More-Jones Brass & M. Co.
Nuttall Co., R. D.
Star Brass Works

Whistles, Air
General Electric Co.
Ohio Brass Co.

Westinghouse Traction Brake

Co.
Wire Rope
American Steel & Wire Co.

Roebling's Sons Co., John A.

Wires and Cables
Aluminum Co. of America
American Electrical Works

American Steel & Wire Co.
Bridgeport Brass Co.
D & W Fuse Co.

General Electric Co.
Kerite Insulated Wire & Cable

Co.
Okonite Co.

Roebling's Sons Co., John A.

Rome Wire Co.

Westinghouse Elec. & M. Co.

Wood Preservatives
Lindsay Bros. Co.

Woodworking Machinery
Allis-Chalmers Mfg. Co.

Wrenches
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UNIVERSAL ANTI-SLIP TREADS

cars and station steps.

Universal Safety Tread Company

40 Court St., Boston, Mass.

SAMSON SPOT WATERPROOFED TROLLEY CORD



Trade Mark Reg. U. S. Pat. Off.

Made of extra quality stock. Army braided and smoothly finished.
Carefully inspected and guaranteed free from flaws.

Samples and information gladly sent.

SAMSON CORDAGE WORKS, BOSTON, MASS.



Service That Suits the Sales Story to the Selling Season

That is Collier Service.

Geographical and weather conditions are at all times given careful consideration so that the cards displayed are seasonable and appropriate to the locality.

We are just as anxious to see that cards are changed with the change in selling seasons as we are to make them attractive in design and printing.

By continually seeking to please the advertiser, we give him the kind of service that assures the railway company of a well established value for its car-card space.

Barron G. Collier
INCORPORATED

Candler Building
220 West 42nd Street, New York City



WOOD DISTILLATION PLANT, COLLINWOOD, TENNESSEE

THE BRASS TACKS OF ENGINEERING PROBLEMS!

We like particularly to sit in on those preliminary conferences where projected plant extensions are discussed, and where we can unravel the Greek of unfamiliar engineering problems and state their solutions in a language which the President, the Directors, and the entire personnel can understand.

We can be useful to you in an advisory as well as in a purely mechanical capacity.

THOMPSON-STARRETT COMPANY

INDUSTRIAL CONSTRUCTION

NEW YORK

CHICAGO

DETROIT

PITTSBURGH

Our Advice is as Good as Our Service



Peter Witt Front-Entrance Center-Exit Cars in Youngstown, Ohio, Saving Time

General Manager, Mahoning & Shenango Railway Company in an article on page 656, Souvenir Convention issue Electric Railway Journal, September 27, 1919, states that the average time required for passenger interchange on

their Peter Witt Cars is.....	1.32	sec.	per	pass.
and on their prepayment cars.....	2.00	"	"	"
A saving for the Peter Witt Cars of.....	.68	"	"	"

The Reason

With the conductor near the center doors the entire forward half of the car serves as a long loading platform and with a double line of passengers entering at busy corners speeds up loading. Collecting fares upon entering from passengers going to the rear end reduces number of fares to be collected at unloading points and this also is a time saver.

**LARGE CAPACITY QUICK LOADING PETER WITT CARS
ABSORB LARGE CROWDS IN THE QUICKEST TIME**

THE J. G. BRILL COMPANY

Philadelphia, Pa.

AMERICAN CAR CO., St. Louis, Mo.
G. C. KUHLMAN CAR CO., Cleveland, Ohio.
WASON MANFG. CO., Springfield, Mass.





GOOD BUSINESS

The Birney Safety Car has proven itself the best stimulant street railway business has ever experienced. A car always in sight means always a full car as the short walker will become a short rider if the means of transportation is available. Being more economical of operation, Birney Safety Cars save money as well as earn it by their stimulation of the car riding habit.



THE J. G. BRILL COMPANY

Philadelphia, Pa.

AMERICAN CAR CO., St. Louis, Mo.
G. C. KUHLMAN CAR CO., Cleveland, Ohio.
WASON MANFG. CO., Springfield, Mass.

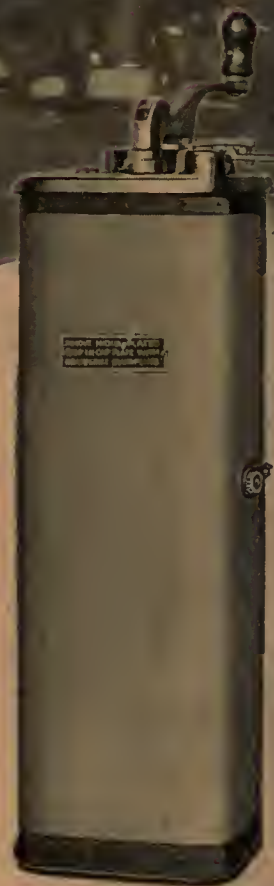




*The Result
of 26 Years'
Development*

Safety cars require control equipment that is light and durable.

The K-63 controller, which meets these requirements, is the result of 26 years' experience with platform type control. Because of its success in this field, practically all safety cars are now being equipped with this type of controller.



General  **Electric**
General Office **Company** Schenectady, N.Y.

ELECTRIC RAILWAY JOURNAL



On Your Payroll

Whether poring over a blue print or figuring a cost sheet, the S K F representative virtually goes on your payroll the minute he faces your difficulties.

So every S K F man justifies the basic S K F policy. He is a salesman only as he serves.

Not to hear bearings exploited, but to absorb the latest ideas on reducing friction—this is why the manufacturer sends for the S K F sales engineer.

And what more authentic advice is to be had than the engineering knowledge of anti-friction experts, supported by the impartial research of thorough, well-equipped laboratories?

Electric railwaymen and manufacturers of electric railway equipment are invited to avail themselves of this service at any time.

S K F INDUSTRIES, INCORPORATED

Sales, Service and Research Division

165 Broadway, New York City

564

S K F INDUSTRIES

Hess-Bright Ball Bearings
S K F Ball Bearings
Atlas Steel Balls
Gronkvist Chucks
Transmission
Hangers

DELAYED ISSUE



“Railway Operating Data”

“Boss,” said Joe to the General Manager, “the Westinghouse Company surely had a fine bunch of real publications down at the Convention. Every one of them was full of information on our different problems. Here is their book, ‘Railway Operating Data,’ giving all the ‘ins’ and ‘outs’ of motor, control, and car maintenance. I have sent to their local office for half a dozen more copies for the men in the shop.”

“Yes,” said the General Manager, “I have been reading this information for quite awhile, and am mighty glad to see the Westinghouse Company put out this data in permanent shape.”

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

Westinghouse

Electric Railway Journal

H. W. BLAKE, Editor

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The Connecticut Company Goes to the Zone Plan

On Nov. 2 a system of distance charges was inaugurated on lines in New Haven, Waterbury, Hartford, Bridgeport and other cities comprising the Connecticut Company system as well as on the connecting lines.....Page 852

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Construction Features of Cars Building at Detroit

Special members are used in the floor and side frame, and there are no bulkheads. The arch roof is in three units without headlining. A special lighting system and ample ventilation have been provided.....Page 863

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The Electro-Pneumatic Brake 1915

*"First, with nicest skill and art
Perfect and finished in every part."*

Train lighting by electricity offered new possibilities in air brake development which were quickly seized upon by the air brake engineers. Generators and storage batteries of the lighting system became available from which to draw current to operate magnetic valves of a further developed air brake to admit and release pressure to and from the brake cylinder. Thus the brakes are given action with electric quickness as compared with pressure impulse.

A strong characteristic of this highly refined type of brake is that it loses none of the long established security of action of the purely pneumatic brake so carefully developed by years of practical experience, for the complete pneumatic brake system is duplexed with the electric and dual action is obtained at each operation.

The elevated and subway trains, on certain steam roads and also on trains of steam roads converted to electric operation are introductorily equipped with the electro-pneumatic brake.

*"Speeding along through the rain and dark,
Like the ghost of . . . some phantom bark,
Guiding the vessel in its flight,
By path none other knows aright."*

Westinghouse Traction Brake Company

General Offices and Works: Wilmerding, Pa.

Atlanta, Ga.
Boston, Mass.
Chicago, Ill.
Columbus, O.

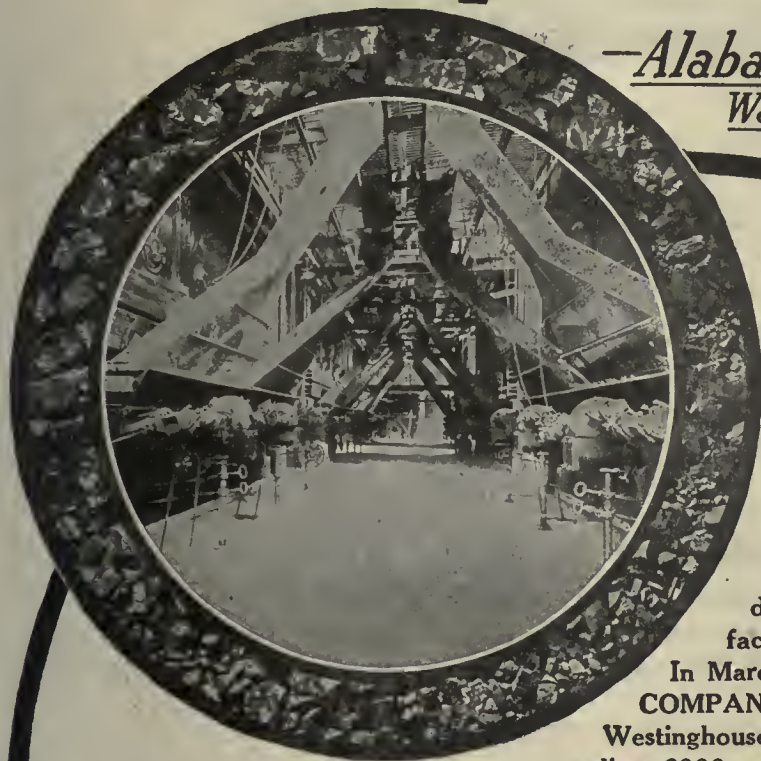
Denver, Col.
Houston, Tex.
Los Angeles, Cal.

Mexico City
New York, N. Y.
Pittsburgh, Pa.

San Francisco
Seattle, Wash.
St. Paul, Minn.
St. Louis, Mo.

The Significance Of Repeat Orders-

*—Alabama Power Company
Warrior Steam Plant*



Buying for our personal needs teaches us the significance of repeat orders. The principle holds good in big business, and when the manufacturer comes back with a second order, it is an indication that the first has been satisfactory.

In March, 1916, the ALABAMA POWER COMPANY placed their first order for five Westinghouse Underfeed Stokers for boilers totaling 6000 rated hp. The performance of these stokers was carefully checked and a year later a second order for two Underfeeds for boilers totaling 2400 hp. was received. This was followed by an order for eleven Underfeeds for boilers totaling 13,200 hp. In August, 1918, seven months later, the ALABAMA POWER COMPANY placed an additional order for two Underfeeds for boilers totaling 1200 hp.

Listed below are a few of the larger companies who have repeatedly come back for additional Westinghouse Underfeed Stoker Equipment.

H. M. Byllesby & Co.
Minneapolis, Minn.
St. Paul, Minn.
Louisville, Ky.
Mobile, Ala.
Canon City, Colo.
Ottumwa, Iowa
Sioux City, Minn.
Galena, Ill.

Dupont Engineering Co.
Wilmington, Del.
Barksdale, Wis.
Carneys Point, N. J.
Philadelphia, Pa.
Williamsburg, Va.
Hermitage, Tenn.
Racine, Wis.
Detroit, Mich.

J. G. White Engineering Corporation
Muscle Shoals, Ala.
Sheffield, Ala.
Hampton, Va.
North Adams, Mass.

United Gas & Electric Engineering Corp.
Lockport, N. Y.
New Orleans, La.
Little Rock, Ark.
Elmira, N. Y.
Alabama Power Co.
Benoit, Ala.
Birmingham, Ala.
Gadsden, Ala.

Let us mail you a copy of Circular describing those features which give the Westinghouse Underfeed its high bustion efficiency.

Westinghouse Electric & Manufacturing Company,
East Pittsburgh, Pa.

Westinghouse





Jackson Finds

There's Wisdom in the Use of Safety Cars

Early in June, 1919, the Jackson Railway & Light Company, Jackson, Tenn., began genuine Safety Car operation. Hardly a month had elapsed before we received the following letter from the delighted user:

JACKSON RAILWAY & LIGHT COMPANY

Jackson, Tenn., July 25, 1919.

Mr. C. P. Cass, President,
Safety Car Devices Company,
Boatmen's Bank Building, St. Louis, Mo.

My Dear Mr. Cass:

So far our new Safety Cars have been very satisfactory indeed. They are *very popular with the public and our men*, and we have had no objection from the city officials.

We have been able to *speed up our schedules*, and there is no doubt of the fact that the cars have *increased earnings*. Very truly yours,

(Signed) JOHN WISDOM, General Superintendent.

Note the portions of Mr. Wisdom's letter that we have taken the liberty of italicizing. It's wonderful how all the fancied objections to Safety Car operation vanish into thin air when operation actually begins. And at Jackson, Tenn., it is the car operators themselves who are most pleased because they had never used air brakes before. But the use of air brakes is only one feature of the making of a Safety Car. It is not a 100 per cent. Safety Car unless it is equipped with automatic, laborless apparatus, so interlocked that, regardless of the illness or distraction of the operator, the power will be cut off instantaneously, the air brakes and sander applied immediately thereafter, and the doors unlatched for safe and easy exit. Furthermore, it is a Safety Car only when the doors must be closed and the step folded before the car can start, and when the air brake must be applied before the doors are opened and the step lowered in bringing the car to a service stop.

SAFETY CAR DEVICES COMPANY

Main Office—Boatmen's Bank Building, St. Louis

CHICAGO
Railway Exchange Building

NEW YORK
City Investment Building

PITTSBURGH
Westinghouse Building

CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.



PRODUCTS

Quality First



O-B Type F-3 Compressed Terminal Bond—Patented

Rail Bonds Belong in the Most Abbreviated Budget

You are paring expenses on every hand. But you encourage expense when you leave rail bonds out of the budget.

How much does it save when subnormal voltage, caused by neglected bonding, results in burnt out armatures?

How much does it save when people fuss, fume and walk while motors limp below speed and capacity on insufficient voltage?

How much does it save to pay for power which leaks away through a poor return?

The tighter money is, the more essential it is that you have good bonds.

O-B Bonds are good bonds.

The Return Circuit is a compact, straight-arm message about bonding. Among other things it describes two convenient ways to find defective bonds. Send for a copy.

The Ohio Brass Company

Mansfield, Ohio

New York

Philadelphia

Pittsburgh

Chicago

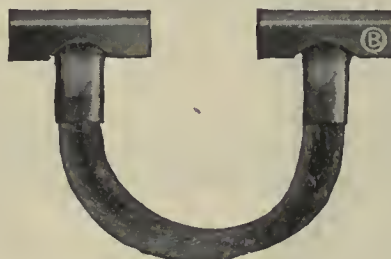
Los Angeles

San Francisco



O-B Type ST-2 Gas Weld Bond.
(Patented)

For installation by Oxy-acetylene process.



O-B Type AW-3 Bond.
(Patented)

For installation by Arc Weld Process. May be used with almost any electric welding machine now on the market.



The chamfered joint of Elreco Poles prevents rusting—and the "Wire Lock" awedge assures a joint which cannot "telescope." Ask for information about Elreco specialties for electric railways.



Note the Simplicity of the Installation of **ELRECO COMBINATION POLES**

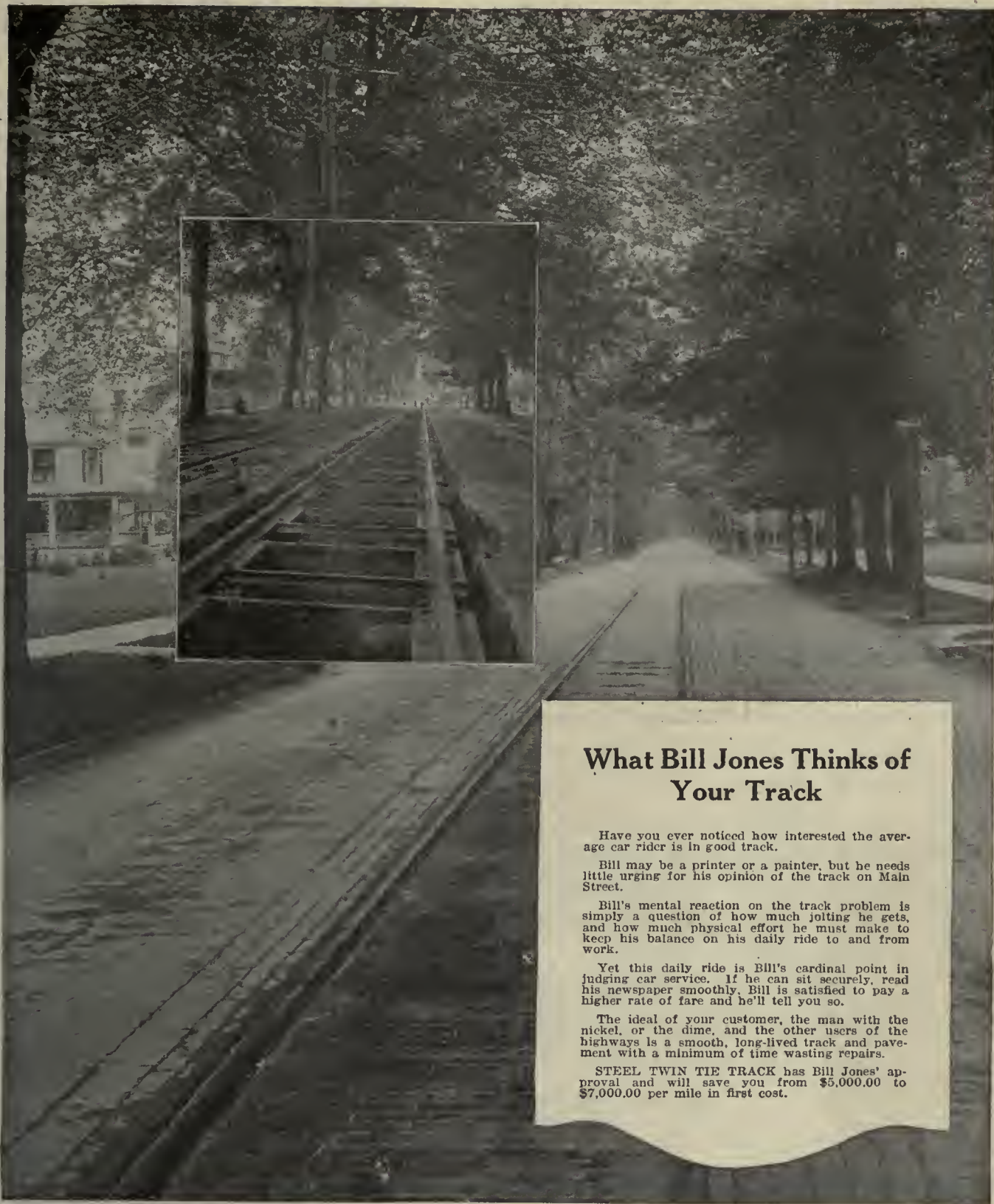
Missoula, Montana, attached Lamp Brackets on her 116 "ELRECO" Tubular Steel Poles and thereby secured Combination Railway and Lighting Poles. These poles support all span wires and lighting fixtures and her curb lines are kept free from extra Lamp Standards.

Full information and photographic reproductions of installations in many other cities are given in our new catalog "F," which is now ready for distribution.

ELECTRIC RAILWAY EQUIPMENT CO.

Cincinnati, Ohio

New York: 30 Church Street



What Bill Jones Thinks of Your Track

Have you ever noticed how interested the average car rider is in good track.

Bill may be a printer or a painter, but he needs little urging for his opinion of the track on Main Street.

Bill's mental reaction on the track problem is simply a question of how much jolting he gets, and how much physical effort he must make to keep his balance on his daily ride to and from work.

Yet this daily ride is Bill's cardinal point in judging car service. If he can sit securely, read his newspaper smoothly, Bill is satisfied to pay a higher rate of fare and he'll tell you so.

The ideal of your customer, the man with the nickel, or the dime, and the other users of the highways is a smooth, long-lived track and pavement with a minimum of time wasting repairs.

STEEL TWIN TIE TRACK has Bill Jones' approval and will save you from \$5,000.00 to \$7,000.00 per mile in first cost.

The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

General Sales Office and Works: Cleveland, Ohio

Save the Rails



There is only one alternative—the relatively early replacement of the track, the rebuilding of the roadbed and the replacement of the pavements to say nothing of regrinding flat car wheels and repairing motors damaged by excessive pounding. The

Reciprocating Track Grinder

has clearly and conclusively shown its ability to greatly prolong the useful life and service of track—in many instances increasing the rail life 15 to 40 per cent.

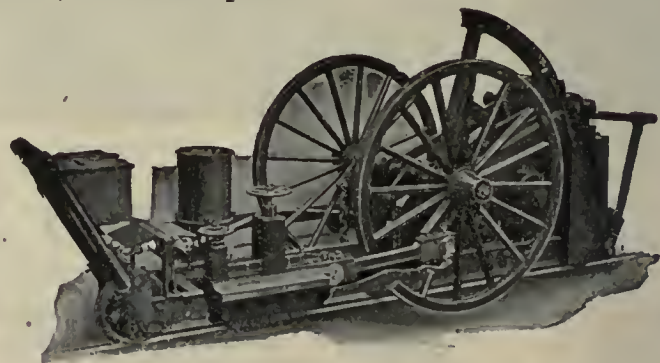
It has done this in cases where stretches of track were in such bad condition from corrugations and cupped joints that replacements seemed the only remedy. The Reciprocating Track Grinder restored the rails to useful service where other types of machines had been tried and found unsatisfactory.

Let us prove this on your tracks at our risk.

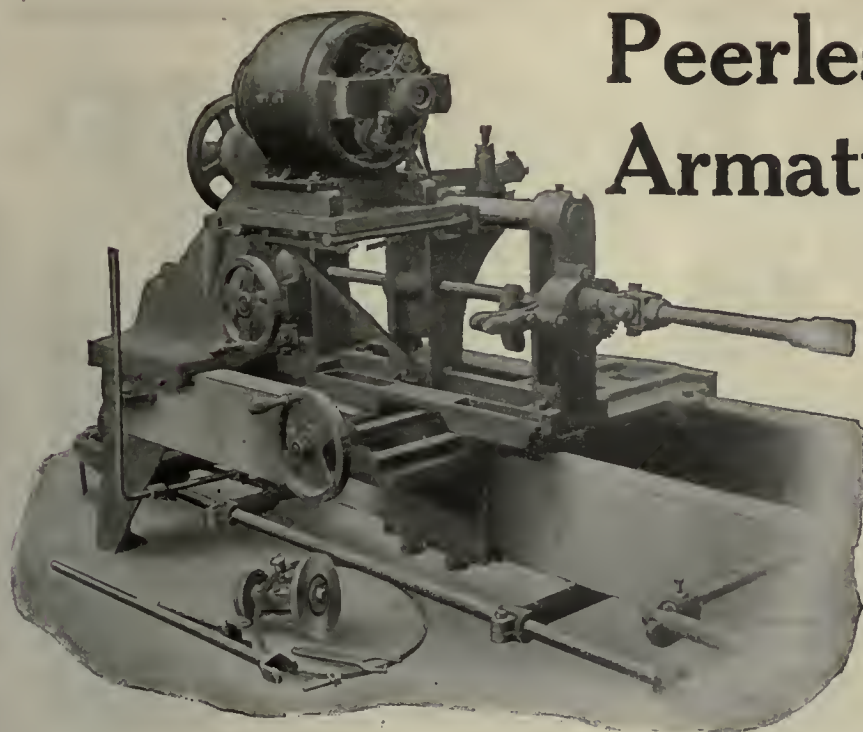
Railway Track-work Co.

30th and Walnut Sts., Philadelphia

**Save the Rails—
Start To-day!**



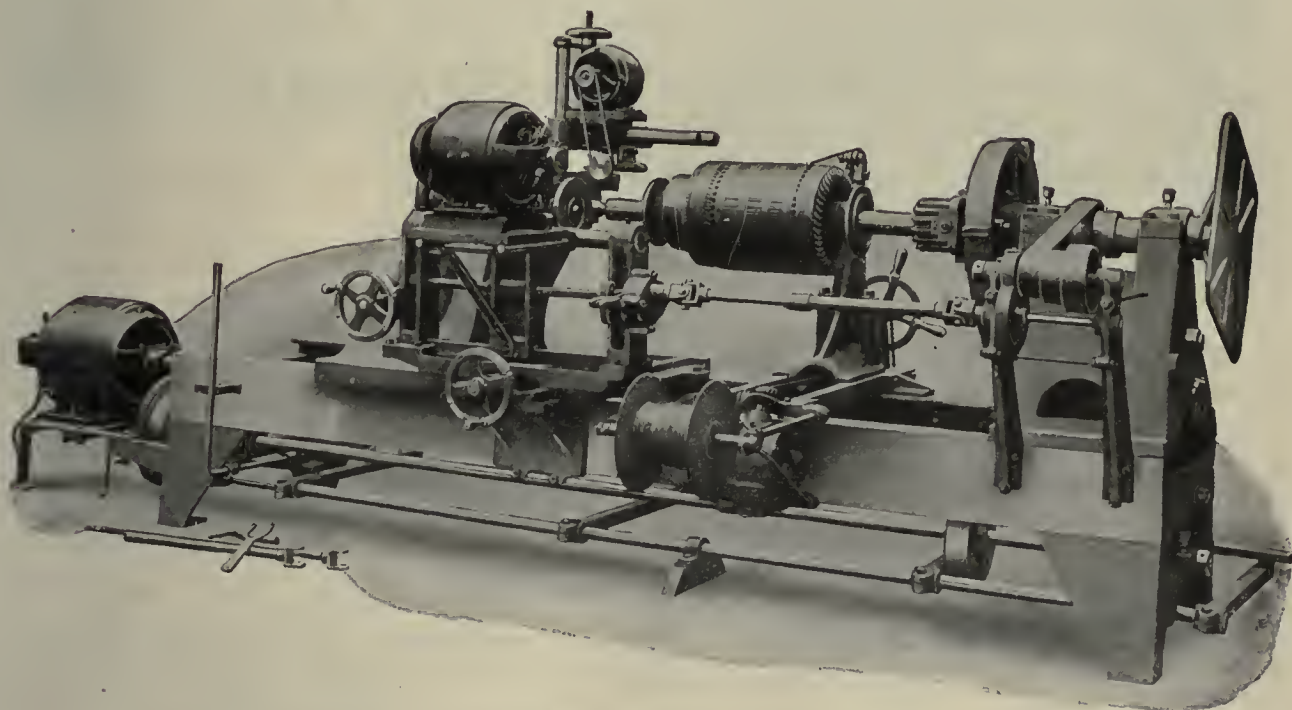
Peerless Universal Armature Machine



Practically every armature repair can be made on the heavy duty Peerless machine, as illustrated above. It consists of a banding machine, commutator slotting and commutator grinding machine and field coil winding plate. It saves time, labor and does better work than primitive methods.

The complete Peerless line also includes smaller tools for use in cases where the different operations are to be carried on separately.

Showing Commutator Grinding and Turning Unit with Automatic Feed Control.



Rear View—No. 19410 Peerless Universal Heavy Duty Armature Machine, Complete With Main Motor and With Armature in Position.

ELECTRIC SERVICE SUPPLIES COMPANY

PHILADELPHIA

17th and Cambria Streets

NEW YORK

50 Church Street

CHICAGO

Monadnock Building

In Day Coaches



In Baggage Cars

YOU are sure to find Crouse-Hinds equipment in many of the railroads of the country. In the day coach installation, the type MOV Condulet with combination reflector holder, socket and shade, is not merely strong and able to withstand the continuous shaking and bumping, but is decidedly good-looking. It is the right fitting in the right place.

For the baggage car the fitting must not merely bring light to where it is needed but must be rugged and strong. Notice how well this has been accomplished in the baggage car installation above, where a Crouse-Hinds type LOC Condulet with combination reflector holder, socket and shade is used.

From the locomotive to the last car wherever your conduit is run, there are Condulets to meet every situation. Perhaps our Engineering Department could be of some assistance to you.



CROUSE-HINDS COMPANY
SYRACUSE, N.Y. U.S.A.



C. M. & S^T P. Installs Economy Meters



One of the new Westinghouse-Baldwin Locomotives of the Chicago Milwaukee & St. Paul Railroad for the electrified Divisions. Each has six 533 twin-armature motors operating from a 3000-volt trolley and utilizing regenerative braking on mountain grades.

Each locomotive has one meter which, in mechanical design, differs from the standard Economy Meter as used in electric railway power saving work, only in the dials and gear trains.

These meters measure the energy consumed in motoring the train and the energy returned to the line through regenerative braking, each reading being shown on one of two cyclometer type dials. They also provide a check on the use of energy in handling the trains and provide operating and engineering data which must be known to check the operation of the system as a whole.

The C. M. & St. P. is one of the many railroads which, in the past few years, has installed Economy Watthour Meters. The reason—*power saving*.

*Write for data on power saving
on freight and passenger cars.*

Economy Electric Devices Company

General Sales Agent

Sangamo Economy Railway Meter

Old Colony Bldg., Chicago

National Railway Appliance Co., New York

Burton R. Stare Co., Seattle

Ludwig Hommel & Co., Pittsburgh

L. A. Nott, San Francisco

J. G. Monahan, Los Angeles





Time Is Money

Most Electric Railways have cars enough to operate their lines successfully except during the rush hours.

However during these hours cars get off schedule and the Public become dissatisfied and ride Jitneys. The Electric Railways lose this revenue just because they are unable to handle the additional rush hour crowds.

If the cars were equipped with *National Pneumatic Devices* this could all be eliminated. The time saved in opening and closing the doors, signalling the motor-man etc., would be cut to a minimum. The schedule would then be increased without increasing the number of cars.

This means that the public would regain their lost confidence and ride more oftener and in larger crowds.

National Pneumatic Devices pay for themselves in a very short space of time. It is to your advantage to get in touch with us and let us show you how we can improve your own conditions.

NATIONAL PNEUMATIC COMPANY

INC.

50 Church St., New York

Edison Bldg., Chicago

Works: Rahway, N. J.

50 Years of Galena Experience

Some one has well said that "to some men experience is a ladder by which they climb to new achievements, while to others it is a rut from which they never get out."

Every year of the half century of experience that lies behind

GALENA OILS *and* GALENA SERVICE

has been a year of progress in better lubrication methods. There is a big difference between the experience that is 50 years *old* and the experience that is 50 years *young*.

There are just as many difficult problems in lubrication methods today as there were 50 years ago.

Galena Service brings to their solution the same fresh vision that has been typical of Galena methods always.

After 50 years we are still willing to grow.

It is that spirit *coupled* with experience that makes Galena Service so valuable to the electric railway industry.

Galena-Signal Oil Company Franklin, Pa.

Works at Franklin, Pa. Parkersburg, W. Va. Whiting, Ind.
Bayway, N. J. Toronto, Can. Rouen, France.

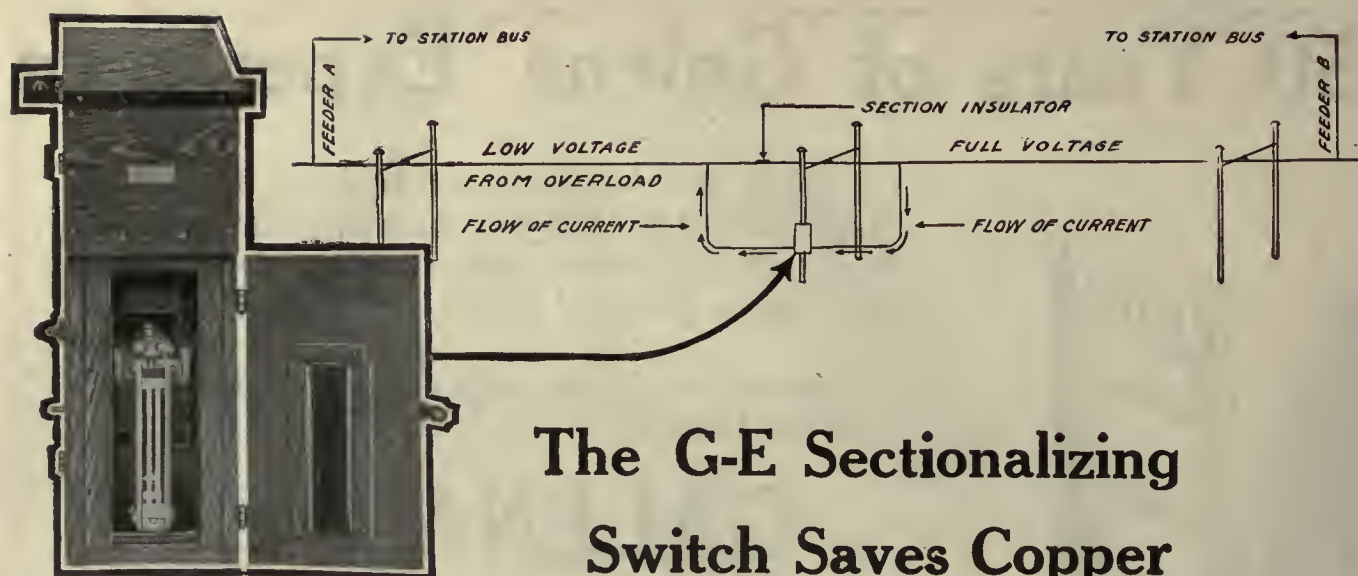
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The date on the cover of this issue does not mean that the news is brought up only to that date. The date indicates simply that we are supplying our readers with the numbers which we could not publish earlier because of the strike.

But every number is brought right up to the date at which the paper was put on the press.

Strike in New York Is Still On.

The strike in New York has not been settled. Continuation of the factional fight between the unions still prevents the publishers in New York from meeting with the true representatives of their men who can take responsibility for speaking for them and making decisions.

The publishers therefore are very generally printing their papers in whatever cities they find equipment available, pending a settlement of the labor situation in New York. It seems apparent that the only way to bring the radical element to sane thinking is to prove by publication that they cannot force the publishers to comply with unreasonable demands.

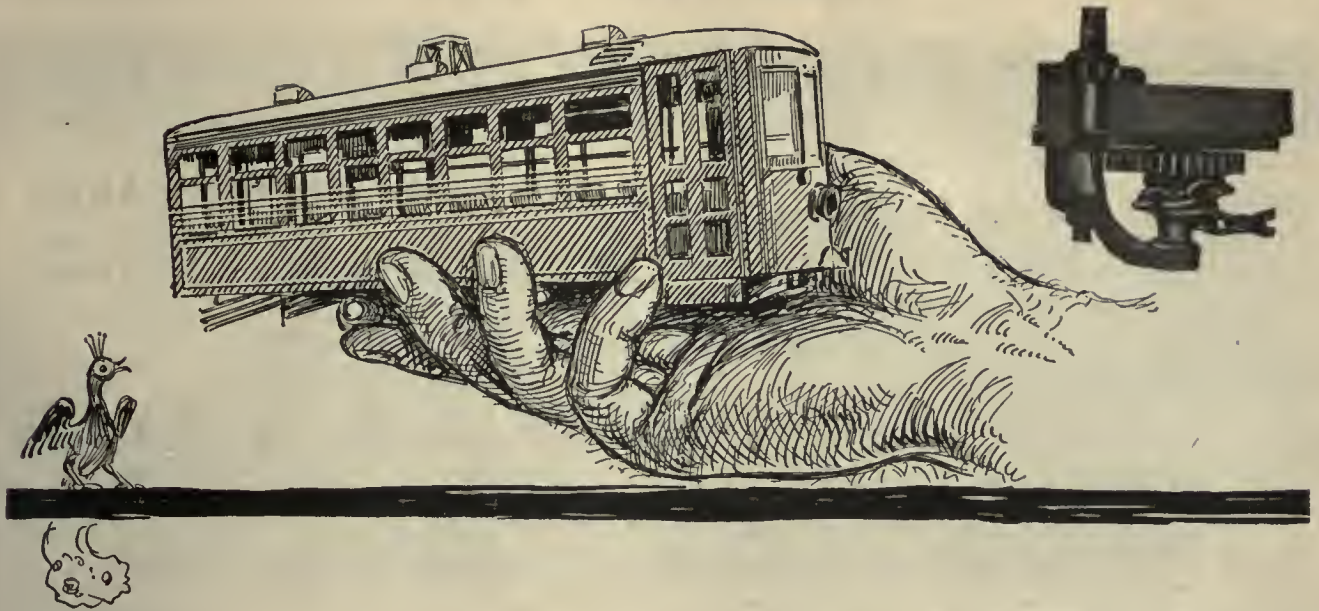
What We Stand For.

In response to the weekly bulletin=letters which have been mailed to our readers giving the "high spots" of the happenings in the industry, we have received a large number of letters which, without exception enthusiastically indorse our stand against radicalism and our desire to meet the present situation fairly by dealing with true representatives of the men in our departments and not with irresponsible exponents of radical thought.

Fundamentally this whole problem is broader than the so-called question of capital and labor, it is a question of production. The commercial future of America and the future of the entire world depend on producing more of all commodities at a lower unit cost of production. As advocates of increased production the publishers of the Electric Railway Journal feel their sense of responsibility.

At this critical period, when there is a real need for our services through both our advertising and our editorial pages, we shall leave no stone unturned to help place the problem of capital versus labor on a sound economic basis in relation to the larger problem of increased production.

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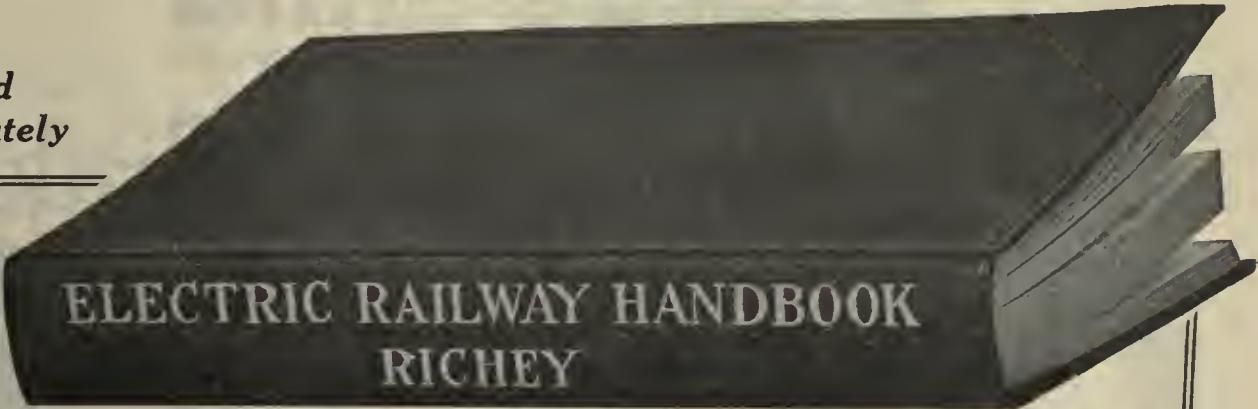
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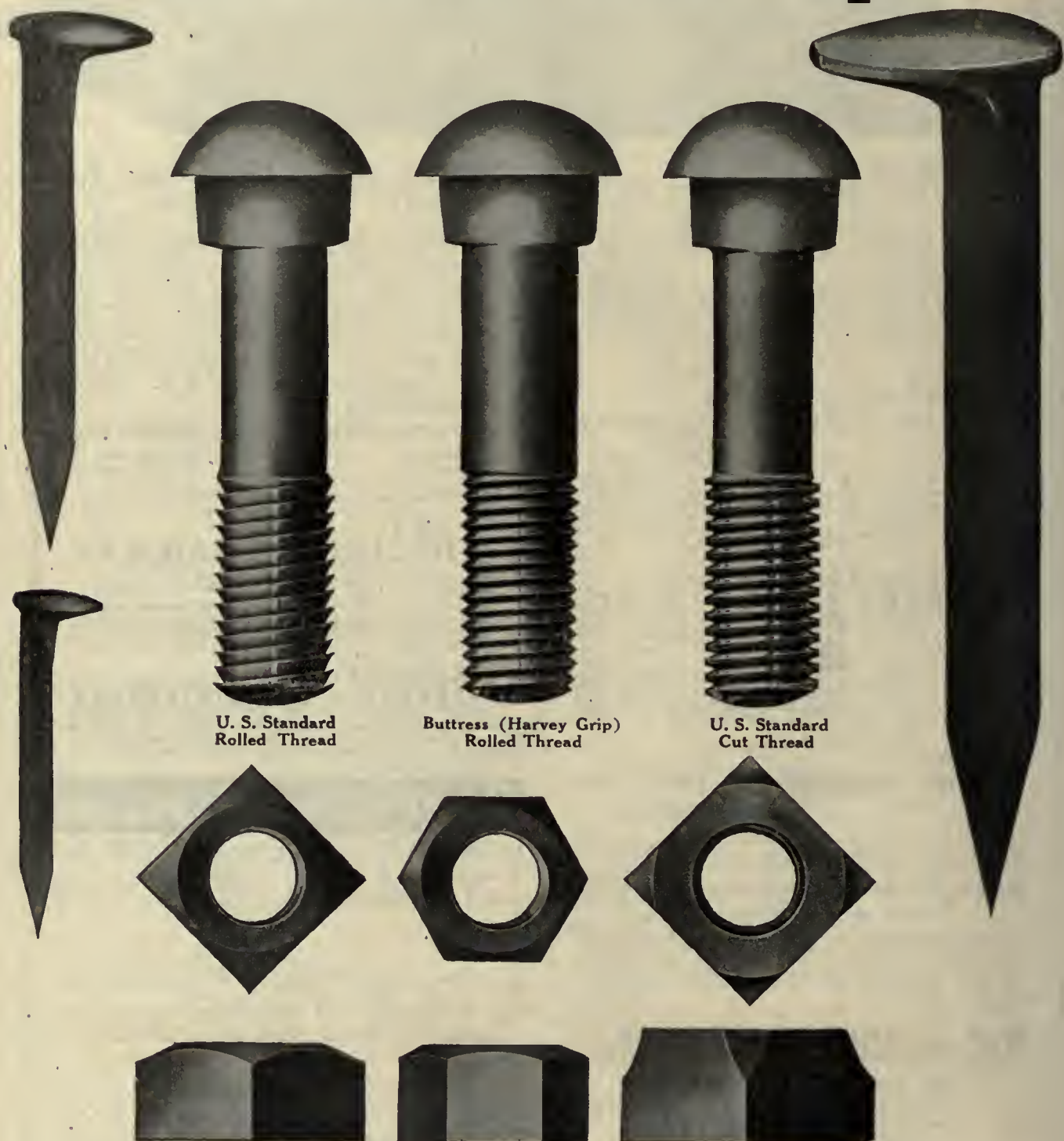
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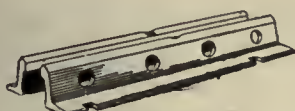
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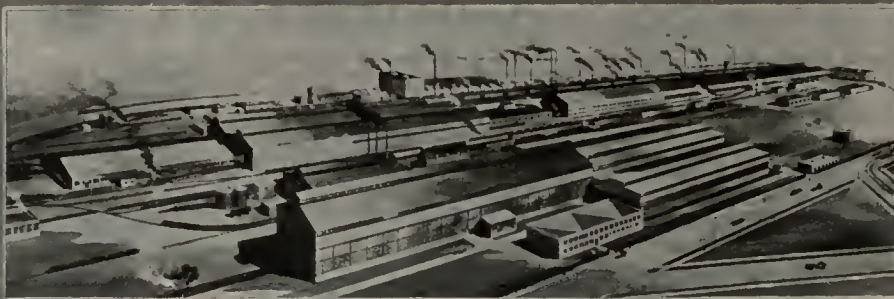
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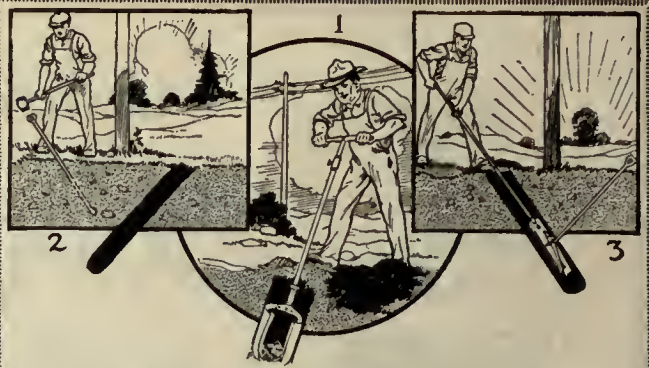
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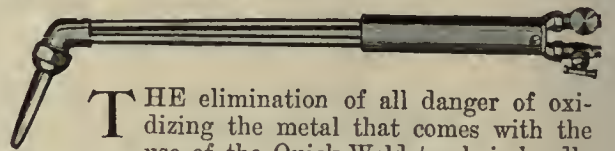
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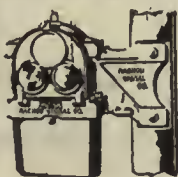
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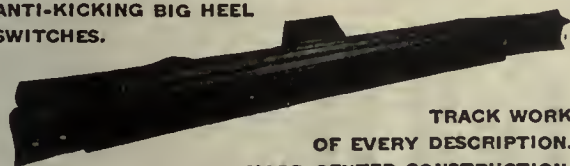
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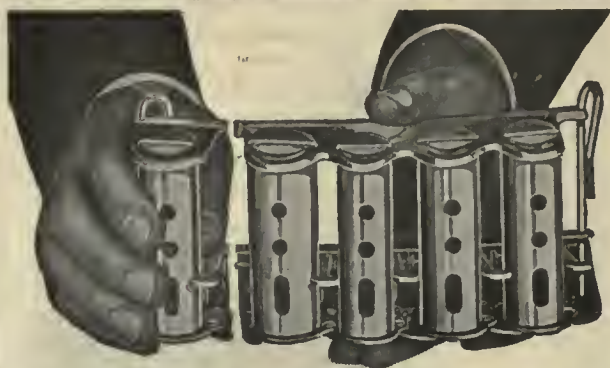
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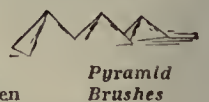
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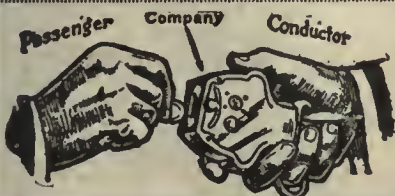
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Seating—14 cross reversible and 4 longitudinal seats, rattan.

Total Seating Capacity—42.

Trucks—Brill #27G-1; axles 4½"; journals 3¼" MCB; wheel base 4' 6"; wheels 33"; tread 3"; flange ¾"; gauge 4' 8½".

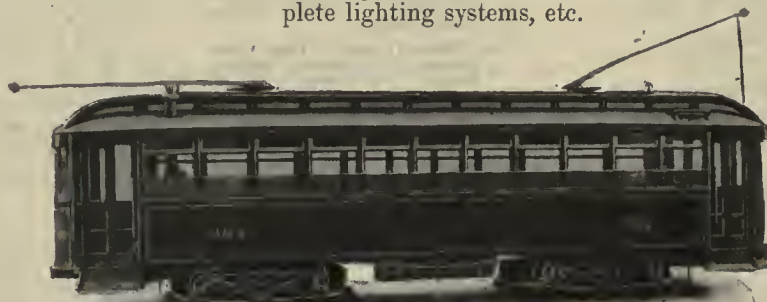
Motors—Four Westinghouse #101-B, gear ratio 69:15.

Controllers—Two Westinghouse #K-28-B.

General Equipment—Westinghouse straight air brakes, compressor tanks, International cash registers, hot air heaters, sanders, complete lighting systems, etc.

Five Double-Truck Interurban Cars

Standard Gauge



General Dimensions—

Length overall	40' 10"
Length over body	30' 10"
Extreme width	8' 1"
Height, rail to trolley base	12' 8"
Truck centers	18' 6"

Seating—14 cross reversible and 4 longitudinal seats, rattan.

Total Seating Capacity—44.

Trucks—Built by American Car & Foundry Co.; axles 4½"; journals 3¼" MCB; wheel base 4' 6"; wheels 33"; tread 3"; flange ¾"; gauge 4' 8½".

Motors—Four Westinghouse #101-B, gear ratio 69:15.

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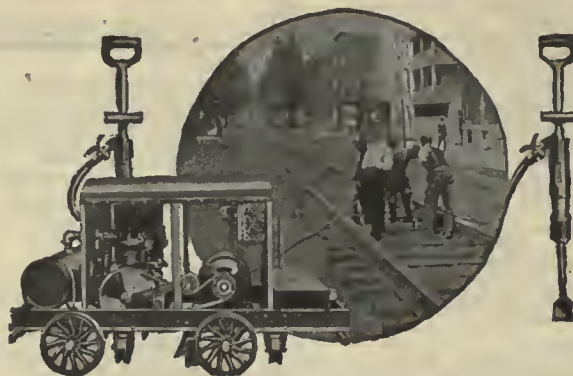
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Steps, Safety
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Franklin, Pa.

Issued on December 5

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Vol. 54, No. 19

Baltimore and New York

November 8, 1919

Speak the Speech of the People

OBSCULESCENCE, depreciation, amortization, reproduction cost new and fair rate of return are soundful and ponderous expressions, but they are as clear as mud to the individual who painfully spells out with one finger any word longer than a syllable. This is a fact not taken into account often enough in preparing publicity copy on the reasons for an increased fare or a reduction in taxing burdens. The language of finance is a long remove from the speech of the people and from their experience in daily life. Householders who buy gas stoves are not in the habit of putting by 10 per cent of the cost of the stoves annually for a replacement fund, and they know nothing about the possibility of obsolescence due to the coming of the superior electric range. But this they do understand: That they can't borrow new money unless they pay the old debt first. That fact lies within the experience of almost everybody. It is true that the average man can't see how it is possible to take in so vast a sum as a million dollars and yet fail to make both ends meet. However, when the fact is set forth that millions of new dollars are needed and can be obtained only by making good on past borrowings, the element of bigness is seen from a new angle.

The best form of such publicity as this will take into account both the limited vocabulary and the limited financial experience of the average man. Furthermore, such publicity will deal with neighborhood problems as closely as possible, since that is the only way to arouse that large class of people with whom: "Co-operation (like charity) begins at home."

Rifts Through the Cloud Rack

THE clouds of adversity still lie thick and heavy over the electric railway field, but here and there one notes a rift of sunshine that gives promise of the return of fairer weather. A conversation that we were fortunate enough to hear at the Atlantic City Convention was illuminated by just such rays of cheer. One of the speakers said that he had always enjoyed good relations with his public, his property being a small one and the management homebred. Nevertheless, said he, it had never been possible for him to avoid heavy charges for paving, changes in grade, etc., because such assessments were considered a matter of course. There came a day, finally, when he had to say bluntly: "Gentlemen of the Council, we would certainly like to

pay the amount you have assessed against us, but we simply haven't got the money. You have asked for \$5,000. Will you call it square if we give you \$500?" To his surprise, the councilors did agree to call it square.

"Now that's pretty good," said the second manager, "But I think my public has treated us still better. So long as our lines were part of a great consolidation, the people in this town wouldn't abate a mustard seed from the assessments possible under the franchise. They said they had been neglected and ignored too long a time by a remote-control management to come forward with the Good Samaritan stuff. But, oh what a difference when the lines of their city were taken out of the big system and restored to the old name and the old owners. After we had opened the books and showed the red glow of bankruptcy with which the figures were suffused, the townfolk O. K'd the passage of a resolution which exempts us from paying taxes for three years. And, say, it's a New England town, too!"

While it is a pity that so important and necessary a utility as the electric railway should have to be thankful for crumbs like these, the hopeful side of the picture is that in each case the public gave the railways a square deal once they clearly understood that their cry of: "Wolf, wolf" was justified. In securing such aid, a small property is likely to have better luck than a big one because of the possibility of appealing to local pride.

Inform the Public Through Its Representatives

RECENTLY, in discussing the various ways of getting new ideas before the public, we had occasion to point out that while the commercial clubs of a community were important centers of influence the fact remained that most of their members were not street car riders personally. Therefore, it was necessary to seek the larger audience of actual car riders, especially through the use of the moving-picture theaters.

Another way of getting at the problem of informing the public is indicated by the successful practice of a Western manager who had found that it was not sufficient to be a good mixer. Realizing this, he set himself the problem of putting all the cards on the table before the board of aldermen of his town. These men, elected directly by the people, are given a frank and full statement in that detail which would be impossible in direct publicity for the masses. The aldermen have every opportunity to raise any question of information they see fit, so that they will not be at a loss if questioned by constituents. One would suppose

that labor partisans, for example, would prove skeptics if not utterly indifferent or unfair. On the contrary, our manager has found that most of these men are honestly anxious to get at the facts. It is different with those who want public ownership at any cost, but these latter are not in sufficient number to prevent judgment on the basis of the facts in the local situation. One fruit of this policy of "nothing to hide" has been the passage of so risky (from a political viewpoint) a measure as an increase in fare and of another which permits the operation of one-man cars. When railways made, or rather thought they made, inordinate profits there may have been wisdom in concealment; today, silence or partial silence is too futile a policy to deserve consideration.

Delayed Issues of This Paper Are By No Means Back Numbers

OWING to the unprecedented conditions in the printing industry in New York City, the *ELECTRIC RAILWAY JOURNAL* is still being printed in Baltimore, Md., and at this writing it is impossible to make any reasonable prediction as to when the publication will be back on a normal basis. Even if the strike should end immediately, it would take several weeks to bring the printing schedules in the McGraw-Hill Company's plant back to normal.

In order to preserve the sequence of numbers and paging in conformity with the requirements of the post-office department, the delayed numbers will be issued in serial order, catching up with the calendar as rapidly as possible, although for some weeks still there will be discrepancy between the date printed of each number and the actual date on which it is mailed. It must be understood, however, that the news in every issue is brought as nearly up to date of that issue as the facilities of the temporary printing office will permit. The office is nearly 200 miles from New York, and as the editorial organizations must be divided between the Baltimore and New York offices, the news service may not be quite as "snappy" and as fresh as the paper prides itself on giving under more favorable conditions. On the other hand, no expense is being spared to overcome all of these handicaps. We are publishing no "back numbers," and shall not do so. At times there may be amusing inconsistencies in statement due to the very rapid progress which is being made in certain electric railway lines at present, and to the fact it takes now from six to ten days to get a paper out after it has been prepared editorially, whereas in New York it takes only two days.

The publishers and job printers in New York City are standing together in an effort to bring the essential printing industry back to a condition where a spirit of reasonableness will characterize the relation of employers and employees in this business. They desire to pay fair wages for good work, but maintain that the reasonableness of wages and working conditions must be determined with regard to all factors involved. They believe that the principles which are to determine the conduct of the business had better be determined now, once and for all, rather than to have interminable dissension and hard feeling.

At present the printing industry in New York is suffering from the lack of harmony among the pressmen and associated workers. Before peace can be established permanently the relations of the "locals" and their international unions must be harmonized, so that when the employing printers negotiate with a responsible organization they will know that the contracts which are made will be respected, and that a spirit of reasonableness will be met in the drawing up of contracts.

Workers in the printing industry are highly paid for the class of work which they do and are among the most fortunate of all industrial workers. Their work is steady, it is inherently interesting, they are comfortably housed, and they receive ample compensation for overtime. The employers are willing to pay even more than at present and to make reasonable arrangements in regard to working hours, but they resent extortionate demands and they ask for stability of conditions and sufficient time to adjust their own contracts with customers to prospective increases in manufacturing costs.

This is the first time in its long history that the *ELECTRIC RAILWAY JOURNAL* has been seriously hampered in its work by manufacturing conditions. As has been explained, every effort is being made to surmount the present obstacles to prompt publication. We have been greatly encouraged by the assurances of support from our readers, appreciation of which will be shown in the only practicable way, namely, by giving the best service of which we are capable.

Too Many Toonerville Trolleys

ONE series in the widely-syndicated cartoons of Fontaine Fox has become almost a household word; and that, we grieve to say, is: "The Toonerville Trolley." These graphic quips at disheveled, unkempt trolley lines have so much basis in fact that the cartoonist seems never at a loss for ideas. We may laugh at these pictures, but if we think seriously about them the laugh will carry the same ache that surely afflicted Socrates when he applauded Aristophanes' cruel burlesque of himself. We must realize that the effect of cartoons like these is to give the public a poorer opinion of the electric railways as a class; to think of them as something belonging to the past and not to be mentioned in the same breath with the gas wagon. Yet where is the bus that can be run at anything like the cost, the speed or the passenger-pleasing qualities of an up-to-date electric railway? We are not talking about the kind of transport to adopt where there is no established traffic, but of what is possible on existing lines where the question is either improvement or elimination of the electric railway.

Why should not the owners of these down-at-the-heel electric railways make one clear-cut invoice and then offer the public the alternative of shutting up shop or of being financed to a level that will make them the pride instead of the mock of the community? It is not hard to demonstrate today that it pays to rehabilitate almost any line that has at least 20 cents worth of gross per car-mile. If it has not, or is not likely to get even that minimum through

higher fares, the owners of the electric railway had better shut up shop and allow the populace to enjoy the merciful ministrations of go-as-we-please jitney or the double-fare bus. Better an honorable demise than a friendless struggle for existence that can only injure those who have got a fair chance to rise out of the Toonerville class.

Comparisons Based on Insufficient
Data Are Worse than Useless

WE REFERRED in our issue of Oct. 25 to the misinterpretation being given in many parts of the country to the fact that the Philadelphia Rapid Transit Company is paying dividends although only 5 cents is charged for a car ride in that city. It is perhaps not surprising that the general public and many daily newspaper men in other cities cannot understand why the railways there should say that they cannot get along with a 5-cent fare, when in Philadelphia people are carried for that sum. Where this question is raised the facts should be given by the railway management. Thus, in our issue of Oct. 25, we published an article on the subject of fares in Philadelphia and Chicago by President Busby of the Chicago Surface Lines, which showed that consideration should be given not only to the minimum fare but to the average fare, length of ride, taxes paid and other salient facts, before final conclusions are drawn. Viewed in this light, the comparison was not unfavorable to Chicago.

There are other cities where incorrect deductions have been drawn from the existence of a 5-cent fare in Philadelphia. An instance at point is an extended editorial in the New York *Evening World* for Nov. 17, in which the Philadelphia example is quoted to show the lack of necessity for any fare higher than 5 cents on the New York railways.

An instructive comparison proving the necessity for a knowledge of all the facts is given in a report recently made public by Alfred M. Barrett, deputy public service commissioner of New York. This report cites the following four fundamental unit figures in which the operations of the companies in Philadelphia and New York differ:

	New York	Philadelphia
Gross earnings per passenger, cents.....	3.736	3.98
Average speed, miles per hour.....	6.95	9.06
Cost of maintenance per car-mile, cents....	11.85	5.58
Taxes paid, in per cent of gross.....	10.05	5.91

It then points out that if the Philadelphia Rapid Transit Company during the calendar year of 1918 had received an average of only 3.736 cents instead of 3.98 cents per passenger, its gross earnings would have been reduced approximately by \$1,975,000. In the same way, if its cost of operating cars had been increased in the ratio of the speeds of the cars in the two cities, namely 6.95 and 9.06 m.p.h., and if the track maintenance had been increased in the ratio of 5.58 cents to 11.85 cents, the operating expenses in Philadelphia would have been increased from \$18,498,386 to approximately \$26,449,000. Similarly, if the taxes in Philadelphia, instead of being 5.91 per cent of the company's gross, had been 10.05 per cent as they are in New York, they would have reached the sum of approximately \$3,000,000.

To sum up, the results of operation in Philadelphia for the calendar year 1918 would then have been as follows:

	Actual Showing Calendar Year 1918	What 1918 Would Have Been
Gross earnings	\$31,704,427	\$29,829,000
Operating expenses	18,498,386	26,449,000
Balance	\$13,206,041	\$ 3,380,000
Taxes	1,871,185	3,000,000
Net earnings	\$11,334,856	\$ 330,000
Fixed charges	9,800,040	9,800,000
Balance for reserves, replace- ments and dividends.....	\$ 1,534,816	(d) \$9,420,000
d signifies deficit.		

Continuing the comparison the report estimates what the New York Railways would have done if its figures in the four points mentioned had been the same as those in Philadelphia. That is to say, it assumes gross earnings per passenger of 3.98 cents instead of 3.736 cents; that its cars were able to operate during the year at the speed of those in Philadelphia; that its maintenance, instead of being on underground conduits 11.85 cents per car mile, was only 5.58 cents, and that its taxes were 5.91 per cent instead of 10.05 per cent, of its gross receipts as at present. Then the comparison would be as follows:

	Actual Showings Fiscal Year 1919	What Fiscal Year 1919 Would Have Been
Gross earnings	\$12,417,679	\$13,176,000
Operating expenses	9,921,411	7,296,000
Balance	2,496,268	5,880,000
Taxes	1,248,197	779,000
Net earnings	1,248,071	5,101,000
Fixed charges	3,423,029	3,423,000
Balance for reserves, replace- ments and income bonds... (d)	\$2,174,958	\$1,678,000
d signifies deficit.		

The comparison in the report illustrates the danger of a superficial inference that the correct standard of fare for all cases is the minimum price at which a ride can be given anywhere. This seems to be the idea behind at least some of the suggestions that have been made by advocates of a prohibitively low fare.

We shall not attempt here to consider whether 11.85 cents per car mile for a road equipped with the underground conduit system and 5.58 cents for a trolley line are too high or too low, whether higher speeds could be made in New York's congested streets, the reasonableness of the taxes assessed in each case or the best way of increasing the average fare in New York. But we do want to emphasize the necessity for full consideration of all facts in comparisons of fares charged in different cities. In this particular case, as shown by the report mentioned, Philadelphia conditions in New York would have meant a surplus of more than a million-and-a-half dollars for the New York Railways, while New York conditions in Philadelphia would have meant a very large deficit.

As Mr. Mitten himself said in his testimony presented in writing at the Washington hearings of the Federal Electric Railways Commission: "Every situation has its own difficulties to overcome."

The Connecticut Company Goes to Zone Plan

On Nov. 2 a System of Distance Charges Was Inaugurated on Lines in New Haven, Waterbury, Hartford, Bridgeport and Other Cities Comprising the Connecticut Company System, as Well as On the Connecting Lines—It Differs in Some Essentials from the Public Service Railway Plan

AFTER a very elaborate traffic study and analysis of the possibility of increasing its income without placing undue burden upon any one class of its patrons, the Connecticut Company on Nov. 2 inaugurated a zone system of charges. For some time it had been operating on the 6-cent flat-fare basis, and this amount is retained as the basic or minimum fare. For this fare a passenger may go from a point in one zone to a point in an adjacent zone, transferring from car to car without extra charge, if necessary. For each additional zone, or part of a zone, a charge of 2 cents is made.

The zones were laid out with the central points in New Haven, Hartford, Bridgeport and Waterbury as the starting points, the length of the first zone from each of these points being about $1\frac{1}{2}$ miles. The second zone measured from each center is in general about 1 mile long, and on some lines within the metropolitan areas there are several sections each 1 mile long. When the sparsely-settled districts are reached, the sections are 0.8 mile long. The sections are of such length that the average rate of fare is 2 cents a mile for rides in congested areas and $2\frac{1}{2}$ cents in less thickly-settled areas.

In the business center of each of the cities mentioned "neutral" areas are provided to permit passengers to ride beyond the geographical center in order to reach the stores in the central business region without paying an extra fare.

The "pay-leave" system of fare collection is used, the passenger on entering at the front of the car being given a zone ticket by the motorman. Samples are reproduced showing typical "in" and "out" checks. In addition,

special zone tickets are used for shop trips, and for extra service on cars which are especially routed.

On leaving the car passenger deposits his fare in a Johnson fare box and surrenders the zone check. If he desires to continue his ride by transferring to another car, the conductor hands him a transfer or "continuing-trip" ticket like that reproduced, enabling him to complete the ride for which he has paid and serving as an identification to prevent his having to pay the basic charge a second time.

Under the new system school children are carried at half rate as before. Special books containing 100 tickets are sold for \$1. When a school child presents a zone check to a conductor, the latter simply takes out tickets to one-half the value of the regular fare. These books are on sale at the company's offices. Formerly paper tickets were used very largely to simplify payment of the 6-cent fare. In place of these metal tokens have been issued, each having a value of 6 cents. These are sold by the conductors in any quantity desired, or they can be purchased in packages of seventeen for \$1, at all points where ticket books were formerly sold.

There are now no reduced rates of any kind in force on the system, although previously monthly commutation tickets were issued on several divisions.

PREPARING THE PUBLIC FOR THE ZONE SYSTEM

On Oct. 1, 1917, the company went to a 6-cent fare. Protests were received by the Public Utilities Commission, particularly from citizens in Hartford. In connection with the Hartford protests the plan of making a distance charge was suggested by representatives of the public appearing before the commission at that time.

Soon after the hearings before the commission, a traffic survey was undertaken by the company, and an explanation was made to the public of the fact that the industry in Connecticut was in a very serious plight. The company stated that at the time it could announce no definite plan for increasing its revenue, but that in due course a plan would be prepared and explained.

While the traffic studies were being made, the company took every opportunity to put before the public and the employees the facts regarding the condition of the industry in general. In this connection liberal use was made of the reports of the hearings before the Federal Electric Railways Commission, which were being held at the time at Washington. On Oct. 6, 1919, a statement was distributed to the press explaining that a zone plan of operation and fare collection would be inaugurated, but a definite date for its inauguration was not mentioned at the time. This announcement brought out editorial comment, for and against the plan, showing the general effect of the educational work which had been done during the previous two years. In the discussion the preponderance of editorial opinion seemed to be favorable to the plan.

On Oct. 20 a definite statement was made that the plan would be inaugurated on Nov. 2. Advertising was then carried out on a broad scale, using large space in all newspapers published in the company's territory. The president of the company, Lucius S. Storrs, also addressed gatherings of citizens in all of the large cities served by its



PRINCIPAL PORTION OF HARTFORD WITH DIVISION OF LINES INTO SECTIONS FOR STUDY OF TRAFFIC CONDITIONS



TYPICAL STREET SCENE ON CONNECTICUT COMPANY'S SYSTEM, SHOWING ZONE BOUNDARY MARKERS FOR FOUR LINES

lines, explaining the workings of the proposed system and the necessity for some such plan in meeting the current emergency.

Samples of some of the printed matter used in the publicity campaign are reproduced in connection with this article.

The results of the advance educational work were evident even before the system was actually put into operation. For example, manufacturers and business firms announced that for indefinite periods they would absorb the extra cost of the transportation for their employees under the new plan, some even going so far as to state that they wished the benefits of the increased fare to be reaped by the railway company rather than by the jitneys. As an example of this the following quotation from a statement made to the employees of the Hartford Electric Light Company by S. Ferguson, vice-president, is of interest:

As it is impossible for employees, especially those living in suburban towns, suddenly to absorb in their weekly budget of expenditure the increase in transportation charges announced today, the company will absorb the increases for a period of six months as follows (details to be announced later).

After Nov. 2 employees whose fares have been increased may purchase weekly, of the company, car tickets sufficient for their use to and from the office at the schedule of charges of the trolley company now in force. The above method rather than a cash reimbursement is adopted in order to insure that the money so expended shall go toward increasing the trolley revenue rather than the revenue of jitneys or steam lines, as it is obvious that reduced transportation rates in Hartford and vicinity cannot be obtained until the trolley revenue exceeds the cost of operating the cars.

Again, comment in every newspaper in the territory showed that the editors realized that something had to be done to preserve electric railway service for the public. This attitude was radically different from that in evidence two years earlier when the fare was increased to 6 cents. Furthermore, that the publicity work made clear to the employees the fact that more revenue was needed was evidenced from the hearty co-operation with which they assisted in putting the new scheme into effect. This was

later officially recognized by the company in a letter from President L. S. Storrs to the employees, commending them for their share in making the introduction of the zone plan a success.

In addition to the general preparation of the employees, already referred to, a comprehensive plan of training was carried out. Meetings of managers and superintendents were addressed by J. K. Punderford, vice-president and



BUSINESS AND RESIDENCE DISTRICTS OF NEW HAVEN WITH DISTRIBUTION OF POPULATION AND ZONE BOUNDARIES

general manager of the company, and others, at which all questions that might arise later were taken up and decided. Then came meetings with foremen, dispatchers, accountants, cashiers, etc., who would be in positions of authority, and who would be required to instruct others in the workings of the zone scheme. A meeting of all of those who had met previously, together with inspectors and others who would later instruct the platform men, was held next,

The men were paid for their time while learning, to the extent of three hours, so that there would be ample time for the instruction. In preparing the rolling stock for the zone-fare operation, it was necessary to inclose all cars. The company had a number of pay-enter cars that required no change, but on the other hand there were several hundred cars with bulkheads that had to be made over. Some had no outside

Viktiga förändringar i spårvagnsmetoder

den andre november

Börjande söndagen den 2 november kommer ett nytt system att införas av Connecticut Company från och till stiga på och stiga av spårvagnar samt upptagte avgifter.

Alla passagerare inträda i spårvagnarna genom den framre dörren.

Passagerare betala, då de gå ut genom den bakre dörren.

Avgifterna varierar, beroende på det avstånd man reser.

Alla Connecticut Company bilar ha blivit indelade i zoner. Överens om var står med spårvagnen. De är alla genom de första två zonerna för sex cents, och sedan reser i vilken zonhelst del av varje annan zon kostar två cents.

När ni stiger på spårvagnen giver motormannen eller ett ansvärlig på vilket område till konduktören, när ni är färdig att lämna spårvagnen.

Giv detta bevis till konduktören, när ni är färdig att lämna spårvagnen.

Edet avgift blir sex cents för de första två zonerna eller det driva plus två cents för varje tilläggad zon.

Konduktören kommer att ha en tydligt tryckt förteckning på avgifter, till vilken ni också kan referera.

På eller första dags resa lär ni kunna edet bestämde avgift. Var god och ha korrekt värd färdig att lägga i avgiftslådan varje gång, ni bestiger spårvagnen.

Var god och forma varnas att betala avgiften, innan spårvagnen stannar, så att ni kan ha på bakre platform färdig att stiga av då ni når edet bestämda platser.

Connecticut Company är nödlämnat att göra denna ändring på grund av det faktum, att under de sista två åren ha dess lönsamhet ökat med 63 procent, eller \$2,700,000 per år, och andra utgifter ökat genom att källa ägandena i stället ha tillagt tusentals dollar till kostnaden för systemets utgållande, så att dess utgifter är större än dess inkomster.

Det beror inte eller osannolikt och osannolikt av varje person, att det det kan förtäta att betala gods lösa till dess substat och att det det blir möjligt att upphälla spårvagnstrafik för folket.

THE CONNECTICUT COMPANY.

IMPORTANTI CAMBIAMENTI SUI METODI DEI TRAM

Due Novembre

Incominciando Domenica, 2 Novembre, La Connecticut Company inaugurerà un sistema sull'entrata ed uscita e pollettizzazione della corsa.

I passeggeri entreranno al carro dalle porte del fronte.

I passeggeri pagheranno all'uscita della porta di dietro.

La corsa varia secondo la distanza che si percorre.

Tutte le linee della Connecticut Company sono divise in zone. Ovunque salite sul carro potete percorrere attraverso le distanze di due zone per sei soldi, e per ogni additional zona che si percorre, a parte di una, si aggiunge due soldi.

Nell'entrare sul carro, il Motorman vi darà una "zone check", sulla quale, a fianco sinistro, viene indicato il numero della zona sulla quale vi trovavate al momento che avete salito.

Davete questo biglietto al Conductor quando state per scendere dal carro.

La corsa sarà in soldi per la prima due zone, e parte di una, più due soldi per ogni additional zona percorsa.

Il Conductor, avrà per vostra referenza una scheda, chiaramente stampata, coll'ammontare della corsa.

Sue vostro primo giorno di traversata, vi sarà detto l'esatto ammontare della corsa.

Vi preghiamo ancora di formarvi l'abitudine di pagare la vostra corsa prima che il carro si ferma, accoché vi troverete sulla piattaforma di dietro pronti a scendere all'arrivo della vostra destinazione.

La Connecticut Company è obbligata fare questo cambiamento per la ragione dei fatti, che nei passati due anni, si ammontò il solo speso di scalo del 63 per cento, cioè \$2,700,000, all'anno, ed altre spese intese per l'operazione delle proprietà, avendo aggiunto molte migliaia di dollari per il funzionamento del sistema, divenendo lo speso maggiore dell'introito.

Domanda la vostra co-operazione e la co-operazione di ogni persona per abituarsi a poter continuare a pagare sui mezzi impiegati un buon salario e fare il possibile di mantenere il suo servizio tramviario al popolo.

THE CONNECTICUT COMPANY

IMPORTANT CHANGES IN STREET CAR METHODS

November Second

Beginning Sunday, November 2, a new system of entering and leaving cars and collecting fares will be inaugurated by The Connecticut Company.

All passengers will enter cars by the front door.

Passengers will pay as they leave by the rear door.

The fares will vary according to the distance travelled.

All lines of The Connecticut Company have been divided into zones. No matter where you go on the car you may ride through the first two zones for six cents, and your ride in any part of each additional zone will cost two cents.

When you enter the car the motorman will give you a "zone check," at the left of which will be the number of the zone in which you entered.

Give this check to the conductor when you are ready to leave the car.

Your fare will be six cents for the first two zones, or any part thereof, plus two cents for each additional zone.

The conductor will have plainly printed schedule of fares to which you can also refer.

On your first day's ride you will know your exact fare. Please have correct change ready to put in the fare box every time you get on the car.

Please form the habit of paying your fare before the car stops so that you may be on the rear platform ready to alight when you reach your destination.

The Connecticut Company is compelled to make this change by reason of the fact that in the last two years its wage expenses alone have increased 63 per cent, or \$2,700,000 per annum, and other expenses incurred in operating the property have added thousands of dollars to the cost of running the system, so that its expenses are greater than its income.

It asks your co-operation and the co-operation of every person that it may be able to continue to pay its employees good wages and make it possible to preserve car service to the people.

THE CONNECTICUT COMPANY

Ważna zmiana w tramwajnej metodzie. Listopada drugiego.

Zaczynając w niedzielę listopada z-go nowy sposób w wejściu i wyjściu również i kolebowaniu pieniędzy ma być przeznaczony przez Tramwajne Kompanij.

WSZYSTKIE PASAŻEROWIE BĘDĄ WCHODZIĆ DO TRAMWAJU PRZEZ PRZEDNI DRZWI.

PASAŻEROWIE BĘDĄ PŁACIĆ WSZCISU TYLNECH DRZWI.

PŁACA BĘDZIE ZMIENIONA ZODNOIE ODLEGŁOŚCI JAZDY.

Wszystkie linij tramwajnej kompanij są podzielone na pasy „zon”. Nie robi różnicy gdzie będziecie jechać na tramwaju to możecie przejechać przez pierwsze dwa pasy za sześć centy i twoja dalsza jazda będzie dla kosztować dwa centy za każdy dodatkowy pas.

Jak będziecie wchodzić do tramwaju to motorman tobie da „zona bilet” na lewej stronie którego, będzie numer pasa pod którym wsiadacie do tramwaju.

Oddaj ten bilet konduktorowi jak będziecie wysiadać z tramwaju.

Twoja плата będzie sześć centy za pierwsze dwa pasy, lub każde przystanki po sześć centy, a dwa centy za każdy dodatkowy pas.

Konduktor będzie miał wyraźnie drukowany रुपیه kosztów jazdy, którą wolno od niego żądać.

W pierwszym dniu twojej jazdy będziecie wiedział swoje prawdziwe koszty przejazdu.

Proszę nie akkuracie wyliczone gotowe pieniądze do wzięcia do „płatnej baki” w każdym razie nieładnie na tramwaju.

Proszę się przyczyniać w placeniu swoich kosztów jazdy, przez ten młm tramwaj atanie będąc na tylnej platformie, ażeby być w pogotowiu złączyć z tramwaju na miejscu przebycia.

Tramwajna Kompania jest zmuszona do zrobienia tej zmiany, z powodu faktu a że za przeszły dwa lata roszchód tyka na pensji dla skłocznych podniósł się na 63 procent, lub 2,700,000, rocznie, a także i różne inne rozchody, jako narazony w operacji proporcji mająj dobawie tysięcy dolarów do kwartu w bieglacem systemie, otuż skutkiem tego rozchód, w ogromnych rozmiarach, przewyższa dochód.

Prosić ci a twoje społeczeństwo a runie społeczeństwo każdej osoby, tak że deduciem mogli, w dalszym ciągu czasu płacić die stałych dobre pensji, a również uczeń to możebnem ulepszyć zachować służby tramwajowej die publiczności.

THE CONNECTICUT COMPANY

NOVEMBER MASODOKTOL KEZDVE FONTOS UJTASOK LESZNEK A KOZUTI VILLAMOS KOCSON.

Uj rendszert lip elseb november masodolnak, vasarnap a kocsokba való felszállás, illetőleg leszállás, valamint a fuvardíjak fizetése nére, amint azt a Connecticut Co. már jóváhagyta.

MINDEN UTASNAK AZ ELŐ AJTÓN KELL FELSZÁLLANI.

AZ UTASOK AKKOR FIZETNEK, MIKOR A HATÁSOL AJTÓN LE AKARNAK SZÁLLANI.

AZ UTASAI DUAK A MEGTETT UTHOZ MERTEN SZAMITATNAK.

A Connecticut Company minden vonala zóna-rendszert lesz. Nem határo, hogy milyen messze utazik, mehet az első zóna, s ha azt követi és csak a következő zónákért fog fizetni két centet.

Amikor belép a kocsba, a vonatvezető fog adni egy zóna-checket, melynek a bal oldalán lesz megjelölve a zóna, a hol felszállt. Adja ezt a checket a kasszának, amikor el akarja a kocsból lenni.

Az utasok díja az első két zóna és hat cent és minden további zónáért két centtel több. A kasszának egy egyszerűen elhelyezett tábláján lesz a zónadíjakról, melyet bárki megtekinthet. Míg az első alkalommal is tudni fogja a pontos zónadíjat. Kérjük, hogy az apró pénzt kasszába adja, amikor belép a kocsba, hogy bebiztosítsa a kassza.

Sajnos hozzá, hogy a zónadíjat megfizesse, mielőtt a kocs megáll, hogy akkorra már kiszállásra késszen lehessen.

A Connecticut Company kíváncsi volt ezt a rendszert behozni, mert tény az, hogy az első két zónaért egyenlő az alkalomzatok fizetése 63 százalékkal emelkedett, ami 2,700,000 dollár évente. Tekintve, hogy mi kisadatok, a mit a kocsokra kellett költeni, szintén óriási mértékben emelkedett, a kiadás tényleg nagyobb volt a bevételnél.

Mi kérjük minden egyes embernek segítségét, hogy fenntarthatassak az üzemet, és a munkásainknak jó fizetéseket adhassunk továbbra is.

THE CONNECTICUT COMPANY.

Важная перемѣна въ трамвайной методѣ. Ноября второго.

Начиная съ воскресенья ноября 2-го дня, новый способ въ вхоу и выходе изъ трамвая и собираніи „фартовъ” будетъ означенъ Трамвайной Компаніею.

КАЖДЫЙ ПОССАЖИРЪ ДОЛЖЕНЪ ВХОДИТЬ ВЪ ТРАМВАЙ ЧЕРЕЗЪ ПЕРЕДНЮЮ ДВЕРЬ.

ПОССАЖИРЫ ДОЛЖНЫ ПЛАТИТЬ ПО ВЫХОДУ ИЗЪ ТРАМВАЯ ЧЕРЕЗЪ ЗАДНЮЮ ДВЕРЬ.

Вся плата будетъ выписана, согласно разстоянію вѣдъ.

Вся линія изъ Трамвайной Компаніи будетъ раздѣлена на промѣжутныя „зоны”. Нѣтъ разницы куда вы ѣдете, такъ только для промѣжутнаго отбута вымъ шесть центовъ, а въ каждой добавочной промѣжутной стоить вымъ два цента.

По холъ въ трамвайный моторный вымъ дастъ „зона бѣгетъ” на лѣвой сторонѣ котораго означено будетъ въ какомъ промѣжутномъ вымъ сѣдѣ въ трамвай.

Отдайте этотъ бѣгетъ кондуктору, когда вы готовы сойти съ трамвая.

Ваша плата будетъ шесть центовъ за первые два промѣжутныя, а въ каждомъ добавочномъ промѣжутномъ.

Кондукторъ будетъ вымъ вымъ платитъ разстоянію вѣдъ, которое вы ѣдете отъ холъ поѣздѣ.

Въ первый день вашей вѣды вы узнаете точную плату самого разстоянія.

Пожалуйста при вступленіи въ трамвай вымъ въ готовѣй правды вымъ плату что вы бросите въ платный ящикъ.

Пожалуйста примѣняйте по угламъ переу такъ какъ трамвайный останавливается, такъ что будуче въ вымъ платформѣ вымъ будите готовы выйти изъ вымъ станціи.

Трамвайная Компанія принуждена была переимѣнить плату вѣдъ, потому что, что фактически, расходы изъ за послѣдніе два года, увеличались на 63 проценты или на сумму \$2,700,000 ежегодно и также другие расходы, произвола неутощено вниманіи, добавляются тысячами долларовъ въ стоимость бѣгетъ системы, такъ что расходы въ большае размѣрѣ превышаютъ приносокъ.

Просимъ вашу корпорацию и корпорацию соотвѣтственной публики, такъ что бы вымъ могли возмѣнить вымъ вымъ оставили, продолжать платитъ возмѣнить маленькіе суммы служащими и сдѣлать возможнымъ сохранитъ удобство публики.

The Connecticut Company.

POLYGLOT POSTER USED IN EDUCATIONAL CAMPAIGN, INDICATING DIVERSITY OF NATIONALITIES

in order that every detail of operation might be gone over. This was followed by a gathering of the general office force and a meeting of the American Electric Railway Association company section, at which the zone system was the topic of discussion.

The platform men were divided into small groups of classes for detailed instruction. Motormen were given actual experience in preparing zone checks, operating doors, etc. Conductors were shown how to collect fares, operate the zone indicator cards, fill out new day cards, envelopes, etc.

doors, and some that had doors were not equipped for their mechanical operation.

The bulkheads were removed from a number of cars, and in all cases the bulkhead doors were taken off. This was done to promote free interchange of the passengers and to contribute to the comfort of the platform men. The vestibule doors were equipped for manual operation. Pipe stanchions were also installed to support the registering fare boxes, the door operating levers being mounted on the stanchions also.



CONSPICUOUS DASHER SIGNS TELL PASSENGERS WHAT TO DO

On many of the cars, change boards like those described in the issue of the *ELECTRIC RAILWAY JOURNAL* for Aug. 16, 1919, page 342, were installed. These previously had been used only on one-man and pay-enter cars.

A zone indicator was developed by the company for use on the cars and built in its own shops. This has the following characteristics: It consists of a board back 10½ in. x 21 in. in size, with a set of 8½-in. x 10½-in. cards, showing on the face the zone numbers and a table of fares to any point in this zone from any other zone on the line. On the back of the cards above is the lettering "Car now in zone." The cards are eyeletted and mounted on removable brass wire arches, so that they can be "flopped over" in passing from zone to zone. The upper set of cards is held in place by a spring-mounted, knurled brass roller, and the cards are protected at the point where they come in contact with the roller by thin sheet metal guards. Metal tabs project from the cards to permit them to be changed readily.

Zone indicators are installed at both ends of the car, but the one at the motorman's end is not used. The indicators are hung on the same kind of keystone lock as that used to support the fare boxes.

Zone boundaries as finally set were determined from data obtained in an elaborate traffic study extending over several months. This was conducted under the supervision of Dr. Thomas Conway, Jr., of the faculty of the University of Pennsylvania. A census of riders was taken on each line on an average day, showing the origin and des-

tinuation of each ride. At the same time surveys of distribution of population throughout the territory were made. These included not only the populations along the line but all residents tributary thereto. For the purpose of study, the lines were divided into quarter-mile sections, as shown on one of the accompanying maps.

From the data compiled the riding habits of the patrons were determined and the zone boundaries were established by the company. A chart of population distribution density for New Haven, together with the zone boundaries, is reproduced herewith.

The zone boundaries are indicated by signs hung from the wires, no pole markings being used. The sign carries simply the line letter and the zone number. The lettering is in black on an aluminum background, this combination

THE
CONN. CO.
BRIDGEPORT
DIVISION

006500

GOOD FOR
ONE
PASSENGER TO
ANY POINT IN
THE
ZONE WHEN
PROPERLY
PUNCHED

NOT
TRANSFERABLE
A. M. HOUR

006500

GOOD ONLY at transfer point on first car after zone transfer. GOOD on line from which transferred. Subject to the rules of the Company.

THE CONNECTICUT COMPANY—BRIDGEPORT DIVISION

SAT NOV 8 1919

GOOD ONLY at transfer point on first car after zone transfer. GOOD on line from which transferred. Subject to the rules of the Company.

THE CONNECTICUT CO.
WATERBURY DIVISION

OUT

Nov. 2, '19

003500

ZONE	8	7	6	5	4	3	2	1
WATERBURY—CHESHIRE								
—NEW HAVEN								

THE CONNECTICUT CO.
WATERBURY DIVISION

OUT

Nov. 2, '19

003500

THE CONNECTICUT CO.
STAMFORD DIVISION

IN

Nov. 2, '19

001000

ZONE	1	2	3	4	5	6
SOUND BEACH						

THE CONNECTICUT CO.
STAMFORD DIVISION

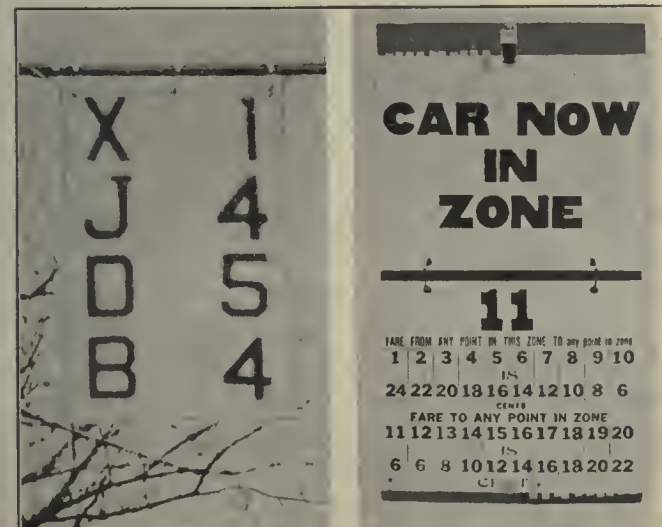
IN

Nov. 2, '19

001000

TAX	TAX	TAX	TAX	TAX
ON FARES OF 82c-93c, inc.	ON FARES OF 69c-81c, inc.	ON FARES OF 57c-68c, inc.	ON FARES OF 44c-56c, inc.	ON FARE OF 43c
701	701	701	701	701
CENTS	CENTS	CENTS	CENTS	CENTS

THE CONNECTICUT CO.
PASSENGER'S RECEIPT FOR
WAR TAX PAID



AT LEFT, ZONE MARKERS SHOWN IN LARGER VIEW. AT RIGHT, ZONE INDICATOR USED ON CARS

- ZONE CHECKS AND RECEIPTS USED IN CONNECTION WITH THE ZONE SYSTEM
1. Transfer and continuing-trip ticket, the nature of the ticket being indicated by punching.
 2. Typical "out" zone check for an eight-zone line.
 3. An "in" zone check for a six-zone line.
 4. War-tax receipt used with interurban fares of 43 cents or more.

having been shown by experiment to be most legible, especially at night.

Where there is but one marker, the sign is 16 in. wide and 8 in. deep, the lettering being 7 in. high. For two lines the sign is 16 in. square. The deepest sign used contains four lines, with 4-in. letters, the sign being 24 in. deep.

No markers are used in the center of the city, as the center of each city is a zone limit on all lines and surrounding each center is a neutral area. The company did not consider it necessary to indicate the limits of the neutral area by markers, but concluded that such markers might prove an unnecessary complication.

In the accounting system used by the Connecticut Company only the simplest records are required of the motor-

THE CONNECTICUT COMPANY

NEW HAVEN CONN., Oct. 25, 1919.

To All Employees:

A few weeks ago we sent to every employee a letter that told how every dollar received by The Connecticut Company is spent.

We showed that 2.9 cents out of every 6-cent fare taken in was paid to employees for wages.

Since that letter went to you there has been another increase in wages, so that today more than one-half of every fare is spent to meet the payrolls.

Since October 1, 1917, rates of pay alone have been increased 63 per cent, involving additional payroll expenditures of approximately \$2,700,000 per annum. To meet this increase without changing the present rate of fare we would have to carry 45,000,000 additional passengers per annum, and this you know is not possible.

Employees should be familiar by this time with the fact that the company's financial condition, like the financial condition of all electric railways, is a matter of grave concern.

For many months The Connecticut Company has been considering every possible means of making its revenues sufficient to equal its expenses. Since 1916 expenses have exceeded income and instead of there being an improvement in conditions there has been a continuing increase in outgo that has left the company without sufficient funds to pay its taxes or to meet the obligations put upon it by the various communities.

WE NEED THE HELP OF EVERY EMPLOYEE

Realizing that it cannot exist indefinitely under present conditions, the Company has decided upon a readjustment of the fare schedules in the hope that sufficient income may be received to enable it to pay the wages and other expenses involved in operating its property and preserve service to the people.

The Company most earnestly solicits the co-operation of every man and woman in its employ.

It cannot continue to pay good wages if it does not receive money with which to pay them.

Employees have it in their power to make the service of The Connecticut Company so good that it will meet with favorable comment and produce greater income.

When the readjusted fare schedule becomes operative on November 2 we want every employee to feel that this change is being made not only in the interest of the public and the company but in the employee's own interest.

We want every employee to understand thoroughly how the readjusted fare system will operate, so that we may feel that every person in our employ is working intelligently for the success of the new arrangement.

THE DISTANCE FARE SYSTEM

For more than a year experts were employed upon a most comprehensive traffic survey of the lines of The Connecticut Company. Checks were made which revealed approximately where every rider went on his regular journey over our lines. The vast amount of data obtained through this survey has been analyzed. It revealed that in some places passengers were able to ride for a 6-cent fare a distance which, if travelled by steam railroad, would cost 33 cents. There are many such unprofitable long hauls. The survey revealed that in some cities the jitneys were taking away the revenue formerly obtained from thousands of short riders.

Every employee is well aware of the fact that although it was generally conceded that the electric railways in Connecticut were deserving of relief, nevertheless no relief was granted them.

The long, unprofitable hauls, the jitney competition, the burdens placed upon our revenues by the State and communities, together with the steadily increasing cost of operating the property have now brought a crisis in the affairs of the Company.

.....

It has been decided to establish a distance fare system for rides over The Connecticut Company's lines, effective Nov. 2.

By this system passengers will pay fares which will vary according to the length of ride they take, just as they pay the steam railroads according to the distance they may travel.

HOW THE SYSTEM WILL OPERATE

Every stretch of track in The Connecticut Company system has been divided into fare sections.

In the four large cities, New Haven, Hartford, Bridgeport, and Waterbury, beginning at the traffic center of the city the first section includes the distance on any line up to one and one-half miles. The next section or sections (the number of these sections being determined by the density of population) are one mile in

shown, as well as the times between which he has worked with each. For each half trip he enters the car number, the origin and destination of the half trip, with time of starting and arriving, the total of zone checks collected, the revenue tickets and passes, the cash and tokens as recorded on the fare box and the transfers collected and issued. Totals for the several items are entered, including the war tax collected. The transfers collected are recorded so as to show the number of identification checks and transfers respectively.

A day card is required for each run and suitable envelopes are provided for inclosing the corresponding tickets, stubs, etc., as follows: (1) For zone checks, one for each trip; (2) for transfers, one for each trip; (3) for transfer trip envelopes for the run; (4) for passes and tickets for the run; (5) for war tax receipts; (6) a "report" envelope for zone-check envelopes, transfer trip envelopes and unissued transfers.

As in the case of the motorman, the conductor gets his supplies in a tin box at the beginning of the day's run, and the last conductor turns in this tin box with the remaining supplies at the end of the run.

The carhouse clerks are responsible for stocking the platform men's boxes with supplies and for keeping track of serial numbers of transfers and zone checks issued to conductors and motormen respectively. From this point on the handling of the records takes the usual course in the comptroller's central office.

THE PLAN HAS WORKED WITH REASONABLE SMOOTHNESS SO FAR

The company has been highly gratified at the way in which the new plan has worked out. A memorandum given on Nov. 10 to the Associated Press contains the statement that after ten days' trial the zone system had proved to be an unqualified success. While it is yet too early to give details regarding the financial results, the income has increased. As far as riding is concerned, the elimination of commutation tickets resulted in protests being made in some quarters, and there was a diversion of some traffic to the steam trains. For the most part there was no loss of riding that could be considered serious.

In Bridgeport particularly, where the jitney fare is 5 cents, the buses did a greatly increased business, but not enough to reduce the income of the company. On the system as a whole the riding did not fall off materially.

On Nov. 8 and Nov. 15, when thousands of strangers flocked to New Haven to attend the football games at "Yale Bowl," the company operated 120 extra cars between the railroad station and the Bowl, collecting 6-cent fares in the old way from passengers going to or from the Bowl. The Bowl is just outside the 6-cent zone-fare limit from the railroad station, but within the 6-cent limit from Church and Chapel Streets, the center of the city. The "extras" were all open cars, and fares were registered on overhead

SAMPLE PAGE FROM LEAFLET OF EXPLANATION TO EMPLOYEES

man. He makes a report to the comptroller for each run, to show the number of zone checks issued. In the morning when the car pulls out from the carhouse, the motorman is handed a tin box (to be kept on the car during the run) containing the supply of zone checks for the day. All motormen on this car use the zone checks from this box.

When a motorman takes a run he enters the reading of the zone pads on his report form and does the same on finishing the run. He simply makes these entries and does no subtracting. He also enters his pad readings at the end of each half trip.

The last motorman on a run turns in a large report envelope containing the stubs of issued zone checks and the whole or partly used pads of unissued zone checks. The tin box is turned in empty.

The conductor's day card requires, as did the one previously used, the date, route and punch mark. This information is placed in the upper righthand corner to facilitate sorting and handling. The names and badge numbers of the motormen with whom the conductor has worked are

YOUR FARE

Beginning November 2, will be SIX CENTS for two zones or any part thereof PLUS TWO CENTS FOR EACH ADDITIONAL ZONE.

Fares between all zones on the line are shown on the conductor's fare card.

Transfers will be issued entitling passengers to complete ride in two zones.

Passengers having ridden in two zones will be given CONTINUOUS TRIP TICKET, entitling them to ride on other lines at two cents per zone.

BE SURE TO GET A ZONE CHECK as you enter—unless you present a Zone Check to the Conductor when you leave at the Rear Door you will be required to pay fare from the starting point of the car on this line to destination.

THE CONNECTICUT COMPANY.

TO SAVE TIME

If passengers will please take seats as near the rear of the car as possible, and pay their fares before the car stops at their destinations, they will co-operate greatly to give good service.

After paying fare, please step to rear platform, thus being ready to alight quickly. You will appreciate the time this will save.

THE CONNECTICUT COMPANY.

Announcing To The Public A Readjustment Of Trolley Fares:

Beginning November 24 a readjusted schedule of fares will be effective on the line of The Connecticut Company, by which passengers will pay according to the distance they ride.

There will be no change in the fare in the central area of the city.

The present 6-cent fare will be retained, and will pay for transportation within the central area—a distance of any line up to two and one-half miles from the center of the city.

The present 6-cent fare also will pay for a ride from any point not more than 1½ miles from the center to any point not more than 1½ miles beyond the center.

Far rides beyond the central area a charge of two cents per zone will be made, and each zone will be approximately a mile in length in the residential areas and four-fifths of a mile in the country districts.

This system has been decided on because it seems to be the most equitable arrangement that can be made, and because there have been public requests for it.

The Connecticut Company had three alternatives:

- (1) A high flat fare of nine cents and probably ten cents in the present area without changing the fare limits;
- (2) The division of the system into a greater number of six-cent zones, or;
- (3) The distance system with the six-cent minimum fare and small increments.

The history of flat-rate fare increases indicates that to be unpopular with the public and unprofitable for the company, and The Connecticut Company believes the distance system will command itself to the public because of its fairness to all riders.

In announcing this readjustment, The Connecticut Company wishes to emphasize that it is a question as to whether the revenue on the new schedule shall produce will be adequate, but it believes that the public now thoroughly understands the financial difficulties that beset the electric railways and will appreciate its efforts to readjust fares with as little inconvenience to the car rider as possible, and with the purpose of securing continuous of street railway service to the people.

Further details of the readjustment will be published later.

THE CONNECTICUT COMPANY.

TYPICAL FOUR-COLUMN ADVERTISEMENT
FROM DAILY NEWSPAPERS

were collected in the center of the city, and when the cars reached the shipyard the men had given up their transfers or continuous-trip tickets and there was no delay in unloading. There has not been any trouble anywhere on the system, even where the least-educated foreign-speaking workers are predominant.

EMPLOYEES HAVE COOPERATED WITH COMPANY

As far as the employees were concerned, the men appear to prefer the zone system to the old one. They consider that the conductor is relieved of the necessity for moving about the car, and the motorman's extra duty causes him to take more interest in his work.

The excellent team work which has been contributed by both motormen and conductors played an important part in the successful establishment of the system. This was so apparent that the trustees of the company, on Nov. 8, adopted a resolution of appreciation of the co-operation given by all employees. At the same time appreciation of the attitude of the public was expressed.

Obviously the success of the plan lies with the platform men. Indications are that in Connecticut they feel that while there are some new duties to be performed under the zone plan, it offers an opportunity for the company to make more money, and ultimately this will react favorably upon themselves. As examples of the way in which the men are contributing to the success of the system, the care with which the motormen call out the zone boundaries at night so that the conductors may set their indicators, the good humor with which the conductors circulate through the cars, asking passengers if they have proper change, desire transfers, etc., may be cited.

While the system has not as yet been in use long enough to demonstrate all of its qualities, the results so far are very encouraging. While some slight modifications may have to be made, in general the possible difficulties have been anticipated. A few protests have, of course, been made and in due time the Public Utilities Commission will consider all of the complaints. In the meantime every effort will be made to give service that is worth the increased fare and to show the public the reasonableness of this increase.

registers. Any transfer or continuous-trip ticket was accepted in payment of fare on the "foot-ball" cars.

Special arrangements to handle impatient shipworkers in Bridgeport were successfully carried out. Many of these workers come from distant parts of the city and have been riding to the shipyard in specially routed cars. They were looking for trouble, and care was taken that there should be none. The extra cars were short-routed, and the men transferred at the railroad station to cars going to the shipyard. In this way pay-leave zone fares

Electrification of French Railways

M. CLAVEILLE, Minister of Public Works and Transports of France, in a report on the future development of French railways, states that it is highly important for France to make the most of its vast resources in water power for generating electricity particularly at a time when its supplies of coal are not going to be sufficient to meet the need of its industries. With this end in view, he had an inventory made, at the end of 1916, of the available hydraulic power of the public water courses, and later, reports were requested for each region, showing exactly the quantity of hydraulic energy which could be used by the public services. A particular study was made of the economical use of electricity for motive power on railroads.

On this subject a special committee of the Railroad Service has recommended the electrification of 5220 miles of track as follows:

Paris-Orleans	1,926 miles out of a total of 4,839 miles.
Paris, Lyons & Mediterranean	1,367 miles out of a total of 6,040 miles.
Midi	1,926 miles out of a total of 2,525 miles.

With the traffic of 1913 the kw.-hr. consumption would have reached:

Paris-Orleans	280,000,000 kw.-hr.
Paris, Lyons & Mediterranean	550,000,000 kw.-hr.
Midi	330,000,000 kw.-hr.
Total	1,600,000,000 kw.-hr.

With the estimated traffic in the immediate future the consumption is estimated at:

Paris-Orleans	560,000,000 kw.-hr.
Paris, Lyons & Mediterranean	1,110,000,000 kw.-hr.
Midi	600,000,000 kw.-hr.
Total	2,260,000,000 kw.-hr.

In determining upon lines to be electrified, the Midi and the Paris-Orleans considered the relation of the cost of electric power as compared with the cost of power with steam locomotives, and the comparison showed that mountain lines with sufficient traffic should be among the first to be electrified. They also considered the location of the source of hydro-electric energy in relation to the lines, and the importance of this power to other industries.

On the Paris, Lyons & Mediterranean, however, the possibility has been considered of using electricity on lines of low grade where there is a heavy traffic, even before putting it on mountain lines where the traffic of these lines is very small.

The proposed sources of electric power are the following:

For the Paris-Orleans—The Upper Dordogne River and its branches.

For the Midi—The Pyrénées.

For the Paris, Lyons & Mediterranean—Certain waterfalls in the Central Plateau and in the Alps, and the enormous reservoir of energy formed by the great plants at present existing or going to be constructed in the region.

The probable cost is estimated as follows, based on prices before the war:

Paris-Orleans	\$94,000,000
Paris, Lyons & Mediterranean	85,000,000
Midi	148,000,000
Total	\$335,000,000

With the traffic of 1913, electrification would save 1,500,000 metric tons of coal, and in the near future the economy should be less than 3,000,000 metric tons.

A special committee has been formed for the purpose of studying the use of electric energy. It at first obtained all the information possible from the principal electric companies, and it will use this as a basis for improving the present legislation, if necessary, in order to promote the development of the distribution of power. Members of the committee have already visited America to study conditions there.

Simplification of Corporate Structures

A Co-operative Plan is Outlined for the Relief of Large Street Railway Systems Through Reconstruction of the Underlying Corporate and Financial Structure—By a Special Increase in Fare a Sinking Fund Is Provided by which Underlying Securities Are Retired, the Equity Therefrom Being Taken by the City

By CHARLES B. COOKE, JR.

Of Kelly, Cooke & Company, Engineers, Philadelphia, also Assistant Manager, Division of Passenger Transportation and Housing, United States Shipping Board, Emergency Fleet Corporation, in Charge of Street Railway Operations

IN REVIEWING the various aspects of the situation which today confronts the operators and owners of those street railway properties which are the outgrowth of successive mergers of smaller underlying properties the fact must be faced that the one factor which, as much as or more than any other, creates sentiment adverse to the partial relief of such companies obtainable through higher fares, is their underlying corporate and financial structures.

Such considerations as may exist in obligations to underlying companies, and these are many and diverse, do not appear to have been of weight in shaping the public attitude which has developed on this question. The popular mind conceives the large street railway company as fattening, through some magical process, upon the rentals it has agreed, and is obliged, to pay to underlying companies. This feeling on the part of the public will doubtless continue to exist, with consequent injurious effects, so long as this particular phase of the situation is available as a bone of contention.

There can be no doubt, therefore, of the beneficial effect on the status of the street railway business, as a whole, if some workable plan could be applied to the situations calling for such treatment, which would enable the operating company and the riding public to provide, once and for all, for ultimate and permanent elimination of the underlying obligations as such, and which would at the same time furnish a solution of the future financing problem.

An appreciation of economic conditions responsible for the heavy burden of increased expenses carried by operating companies discourages any hope that some avenue of escape will open up by which the consequences of exorbitant costs of operation may be avoided. Lacking permanent relief through the channels of sufficient revenue or less expense, it is not unreasonable to expect that successful attempts may be made by public, or semi-public, agencies to enforce measures of inequitable relief through the dangerous process of arbitrarily scaling down underlying obligations.

The evil effects of such a possibility turned into a probability or certainty, in undermining and wrecking established standards of value and credit, can hardly be overestimated. It would involve not only confiscation of the assets of individual holders of securities bought on the basis of such established values, but also those of life insurance companies, savings banks and trust companies. It would undermine the value and integrity of the great volume of collateral trust obligations issued upon the pledge of such securities. These far-reaching and disastrous results would be the certain outcome of any attempt to relieve street railway finances through attack on underlying obligations or commitments. They would not be avoided or softened, however just and true contentions might be that such obligations came about through manipulation by promoters of early street railway enterprises. Such manipulation did, of course, occur in many cases, but while I am not an apologist in any sense for practices

economically and ethically wrong, it may as well be recognized that this particular milk has been spilt. It cannot be recovered through practices similarly wrong on the part of the public, damaging alike to the present security holder, who is the innocent third party, and to the best interests of the community served by the street railways whose securities would thus arbitrarily be depreciated.

"WATER" OFTEN COUNTERBALANCED BY SUSPENSION OF DIVIDENDS ON CASH INVESTMENTS

It has become the custom among the misinformed generally to regard securities outstanding in excess of visible physical investment as "water" representing nothing of value, and therefore to be eliminated as a factor in the fixation of utility earnings. This is false doctrine. It is as oppressive and hurtful to public utilities as it would be to industrial enterprises if the latter were required to fix the prices of their products on the basis of investment in their present manufacturing plants. While it is true that these types of investment enterprises bear different economic relations to the local and general public, yet it is equally true that the investor looks coldly upon such academic distinctions in choosing where to place his money.

In considering situations which, in the past, may have been subject to excessive security issues, there are many factors of which full account must be taken before it can be determined if those situations are today overcapitalized. It is not proposed to discuss such factors herein, but for illustration brief mention might be made of one. Where underlying companies have issued unjustified securities, a frequent result has been that subsequent operating companies, which leased them subject to their fixed charge commitments, have been unable, for a period of years, to pay even a fair rate of interest on bona fide cash paid in on the stock of the operating company. This applies to the operating company now on the premises as well as to former operating companies during their periods of active life. The aggregate of the interest or dividend money thus not paid clearly and logically replaces an equal amount of such unjustified securities as may have been issued, with actual though intangible cash investment. The necessity for considering such questions as early investments in facilities which became obsolete over night and scrapped need hardly be mentioned in view of the wide-spread attention given to this subject.

If the original promoters took unjustified profits, it was done under then existing laws and could have been stopped at the time through proper restrictive legislation. If the early development of public utility enterprises had been hedged about with present-day safeguards, such abuses as occurred could certainly have been diminished, if not entirely prevented. It was, however, the prospect of large profits quickly made that brought the needed large volumes of capital into this field for the development of what was then an infant enterprise, the future of which was conjectural. Lacking such an attraction, it is difficult to believe that transportation facilities would have developed

with that rapidity which marked the early days of the electric railway, and which was required by and essential to the expanding industrial and social needs of the community.

Such factors as these have weight and demand consideration in the development of any plan for establishing permanent means of relief for the street railway with its financial intercorporate structure, as at present constituted. It appears to be axiomatic that any such plan, to be workable, must not contain features prejudicial to the ultimate best interests of the parties in the premises, nor countenance any violation of the fundamental and sound principles of equity which underlies the present economic system.

REMEDY MUST BE EQUITABLE TO CAPITAL

The riding public must recognize that its primary requirement from the railway company is service, adequate in all respects to its needs. To provide adequate and satisfactory service, new capital must be continually invested in the facilities needed to give the car rider what he wants. The general investing public constitutes the only continuous source of supply of new capital, and so long as there was assurance of satisfactory returns to such new capital, it flowed freely into street railway investment. Under existing conditions, broadly speaking, there is no assurance to the investing public of fixed and permanent returns on investments in street railway securities, and these are consequently passed by in favor of other more reliable and productive opportunities for investment. The investing public in effect says to the riding public that if it is unwilling to pay the investor for the use of his capital in obtaining that which is wanted, *i. e.*, service, then it must be satisfied without service of the required kind, or participate in some plan for raising new capital which is not based on sale of securities to the investing public.

There exist contracts and agreements between holding or operating companies and underlying companies which are unbreakable under present laws. The terms of these cannot be modified to the detriment of any of the parties having a direct interest, at the request of those who have no such interest. Any action with this end in view on the part of public or semi-public organizations or individuals for ulterior motives would not only further undermine confidence in railway investments but would constitute nothing less than an attack on the very foundations supporting the present social and economic order. These will remain sound and secure so long as contractual agreements made in good faith are sustained by accepted law, and no longer.

No equitable, and therefore no successful, solution of the street railway problem can be sought through any method based upon the scaling down, or elimination of, underlying security issues without equivalent compensation to the holders for the established values of their securities. The investing public will not provide the means to make this compensation and for this reason the operating company cannot. The question then immediately arises as to how such compensation shall be made, if it is considered essential by the three major parties at interest to eliminate the underlying corporate structure and to change the character of the obligations arising therefrom, as a factor in a given street railway situation. Such elimination would be, without question, desirable from the standpoints of the several parties at interest, providing it can be done in a way that is fair and equitable to all concerned and interested in the stabilization and improvement of the street railway industry as to adequacy of service, as to an attractive field for investment, and as to the elimination of the underlying security, which is the skeleton in the street railway closet. It always offers an inviting point of attack which may not always be as invulnerable as it is under existing legislation and recognized principles of equity.

The situation clearly calls for the development of some sort of co-operative financial plan involving participation on the part of the holding or operating company, the underlying companies, the car-riding public and the bankers who have assumed, in whole or in part, the responsibility of financing street railway properties.

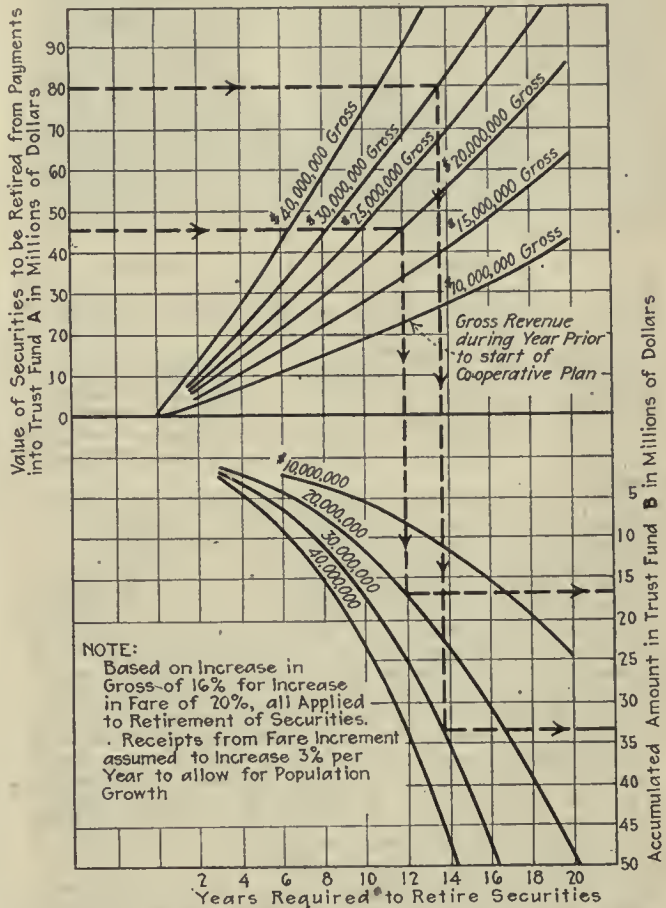


CHART SHOWING RATE OF ACCUMULATION OF TRUST FUND UNDER PLAN OUTLINED

Before proceeding to the consideration of such a plan, it would be well to crystalize the primary objects which its execution must accomplish. These appear to be as follows:

1. It must provide a perpetual guarantee that the riding public will get new and additional transportation facilities as and when needed to serve existing territory, as well as new districts developed by changing centers of population. The riding public has not at present, and will not have so long as the present situation continues, any such guarantee or assurance. The guarantee of adequate service facilities at ultimately lower cost represents consideration to the riding public for its participation in a co-operative plan such as later outlined.
2. The holders of underlying securities must be compensated for their holdings upon the basis of the value conferred thereon by underlying contractual agreements and guarantees. This in conjunction with the removal of the possibility of wholesale depreciation of these securities resulting from either a receivership or from some inequitable form of adjustment of underlying obligations, constitutes consideration to the underlying companies for their participation.
3. It must stabilize the street railway security and furnish a direct means for financing the construction and operation of facilities required for service of the riding public. Such provision for new capital requirements and insurance against operating deficits represent consideration to the operating company, the public and the banker.
4. It must simplify the underlying financial structure for the operating company, changing the form and ultimately the amount of underlying fixed charge obligations. The benefits and advantages so derived under a co-operative plan may be distributed equitably between the operating company and the riding public, and constitute additional consideration to both of these.

In presenting the following suggestions of what might comprise the main features of a co-operative financial plan, designed to accomplish these objects, it is appreciated that its successful application would call for departure from established precedent in street railway financial operations, as well as for courageous and far visioned recognition, by regulatory bodies, of their duties in the premises. Many difficult questions of law, finance and equity would have been solved, and these would be of a character to engage the abilities of the keenest minds now struggling with the financial, legal and economic operating phases of the street railway problem. The following central ideas, around which an effective plan might be developed, are put forward as constructive suggestions to meet a situation in which these are needed:

1. A board of traction fund trustees to be established, with a permanent membership of five trustees to be selected through a system of balanced non-political appointments representing supervision of the state utility commission, the city and the operating company. An auxiliary temporary membership to be organized which shall be composed of representatives elected by protective committees for each class of underlying security.
2. The operating company to secure an increase in fare under an agreement to devote all or such part of the net proceeds therefrom, as may be practicable, to certain uses hereinafter defined.
3. The traction fund trustees shall establish two separate and distinct trust funds, which may be called "Trust Fund A" and "Trust Fund B," and shall have absolute jurisdiction over the receipts of and disbursements from these funds.
4. The amounts collected from the riding public through the fare increase provided in Paragraph 2 above are to be paid by the operating company, in whole or in part as may be agreed upon, into Trust Fund A. The amounts so paid in are to be used by the trustees for the purpose of buying in underlying securities at an equitable price in accordance with a plan to be developed by them, based possibly upon the order of the priority of the lien of such securities on the earnings of the operating company, or on those of holding companies in the underlying structure. The fare increase authorized for sinking fund purposes is to be applied thereto exclusively and is not to be regarded in any way as an increase to provide for current operating requirements, which is a problem separate and distinct from that herein considered.
5. All questions concerning the equity of the settlement made for each class of security shall be heard before the board, shall be investigated and reported on by a committee of trustees appointed for that purpose, and shall be decided finally by general vote of the board after full and complete consideration of all factors of weight in reaching a balanced and equitable settlement.
6. As such securities are so acquired by the trustees, the operating company shall then immediately cease paying interest charges or dividends thereon as such, but instead, shall pay an exactly equivalent amount into Trust Fund B during an initial period to be agreed upon. Provision to be made that during a period subsequent to the initial period, there shall be a gradual reduction of amounts paid into Trust Fund B in lieu of the retired underlying obligations.
7. Ultimately, all underlying securities will be in the possession of the trustees, and as and when this occurs the fare increment authorized for this purpose shall be eliminated and no further amounts shall be collected for Trust Fund A. As each class of security is retired the auxiliary trustee representing that security shall be retired automatically from the board.
8. The payments made by the company into Trust Fund B in lieu of interest and dividends or underlying securities are to be used for the benefit of the riding public, either in increased and improved service facilities, or paid back through the medium of lower fares, or through a balanced combination of both methods. As consideration for this use of Trust Fund B, it shall also be made available to the operating company as protection against extraordinary obsolescence and as a buffer fund out of which may be made up such operating deficits as may occur, due to lowering the rate of fare below that justified by the cost of service.
9. Fair value of the property upon which the operating company shall be allowed to earn, to be determined and used as a basis for future property accounting. The company to be allowed a fixed return on such fair value, plus a share in the profits above the fixed return, the balance of the profits to be paid into Trust Fund B.
10. Depending upon the size of Trust Fund B, the operating company could either depend upon it entirely as a source of

new capital, or use it in conjunction with capital raised by sale of securities. These, owing to the margin of safety introduced by the existence of the trust fund, and the elimination of underlying obligations, would be rated accordingly and salable on a low interest basis.

11. New and covering franchises to be obtained, designed to meet modern conditions and requirements.

12. The board of trustees to conduct an educational campaign to inform the public as to the purposes of its operations, the results thereof from time to time and the benefits accruing to the riding public.

AN EXAMPLE IS GIVEN

To illustrate the principal of operation of the proposed plan with specific figures, an assumed case of a company with a present gross on a 5-cent fare of \$20,000,000 and underlying securities outstanding in the value of \$45,346,000, has been worked out in Table I. It has been further assumed, simply for illustration, that the net increase with gross from a fare increase of 1 cent, after allowing for decreased riding, would amount to \$3,200,000 in the first year of operation of the co-operative plan, and that thereafter there would be an annual growth of receipts from fare increase, following growth of population, of say 3 per cent per annum. Based upon these figures, the underlying securities would be retired out of Trust Fund A in approxi-

TABLE I--ASSUMED CASE SHOWING PRINCIPLE OF OPERATION OF TRUST FUNDS A AND B

Value of underlying securities.....		\$45,376,000	
Present gross revenue of operating company with 5-cent fare.....		20,000,000	
Assumed increase of gross with 6-cent fare.....		3,200,000	
Additional Receipts from Fare Increase Paid Into Trust Fund A		Amounts Paid into Trust Fund B in Lieu of Interest and Divi- dends, on Retired Underlying Securities	
		Accumulated Value of Retired Securities	Accumulated Amount Available for Capital Requirements and Other Purposes
	Each Year	Each Year	Each Year
One year	\$3,200,000	\$3,200,000	\$192,000
Two years	3,296,000	6,496,000	389,760
Three years	3,395,000	9,891,000	593,460
Four years	3,495,000	13,386,000	803,160
Five years	3,600,000	16,986,000	1,019,160
Six years	3,710,000	20,696,000	1,241,760
Seven years	3,820,000	24,516,000	1,470,960
Eight years	3,920,000	28,446,000	1,706,760
Nine years	4,050,000	32,496,000	1,949,760
Ten years	4,170,000	36,666,000	2,199,960
Eleven years	4,290,000	40,956,000	2,457,360
Twelve years	4,420,000	45,376,000	2,722,560

mately twelve years. In this period Trust Fund B, available to the company as a source of new capital and for other purposes, would have increased from \$192,000 in the first year to \$16,746,660 in the twelfth year, these amounts being in the form either of cash or of interest-bearing obligations of character and amount approved by the traction fund trustees.

The accompanying chart shows an estimate of the rate of accumulation of Trust Funds A and B for companies of present gross revenues of \$10,000,000 to \$40,000,000, and with underlying security values up to \$100,000,000. The directional line indicates the method of reading the chart. Starting at the upper scale on the left, representing total value of securities to be retired out of the fare increase, project horizontally to the intersection with gross revenue curve, thence downward to the horizontal scale of years required to affect retirement. Project therefrom downward to the intersection with the gross revenue curve in the lower quadrant, and thence horizontally to the scale showing the accumulated amount in Trust Fund B for given conditions at to security values retired and present gross revenue.

The administration of Trust Fund B may be handled by such means as will constitute simple and powerful financial machinery, through which the riding public may secure to itself such service facilities as may be required, and through which the operating company may be protected if the cost of operating such service facilities proves to be excessive.

The central idea is that instead of earnings from railway operation being paid out in the shape of interest to underlying security holders, who in turn divert it to other uses foreign to industry, this interest money will be retained, either in liquid or equivalent form, as a permanent and gradually increasing fund for the betterment and intensive development of transportation facilities for the riding public which has contributed thereto. The perils arising from participation of the municipality in either ownership or operation of transportation facilities would thus be permanently avoided, with advantage to all interests concerned.

Probably no other course of action or policy which could be adopted by regulatory bodies, street railway management and holders of its underlying obligations would have such an immediate effect in building up public confidence in street railway investments as the inauguration of a determined effort gradually to release the industry from a situation which will continue to threaten and impede its development so long as it is passively accepted by the parties at interest. Certainly, the needs of the times require that the financial foundations of the industry be reconstructed along clean cut lines that will function positively and effectively to the end that the street railway may fulfill its destiny as the real backbone of the community it serves.

SIMPLIFICATION OF CORPORATE STRUCTURES IS DESIRABLE

The industry as a whole is at the threshold of a new era in which conditions affecting its welfare will be of different order from those heretofore encountered. The new course cannot be steered boldly and effectively by looking back at the old landmarks, nor by passive adherence to the heritage from such past corporate practices are now generally appreciated as economically unsound. These practices, under the circumstances of their origin and present-day conditions, must of necessity be broadly considered as in the nature of a passing phase of the development of the street railway to its present place as the admitted keystone of the community arch, and corrected once and for all, without prejudice from that standpoint.

The riding public, the general public, the industrial community and the operating companies are, in kind, equally and vitally interested in placing the industry, as a safe and sound business proposition, on the broad highway of permanent and ever increasing usefulness to the population at large. It is not clear how this can be done in the premises, except through action based on real and constructive co-operation between the parties having a direct and important interest at stake.



A PLACE FOR EVERYTHING AND EVERYTHING IN ITS PLACE

Stockroom Records and Practice

Indiana Company Rehabilitates Its Stockroom and Adopts Motto "A Place for Everything and Everything in Its Place"

THE Indiana Railways & Light Company has recently combined under one roof its stockrooms for the lighting, steam heating, interurban and city railway departments. The building which is being utilized stands on the shop and track storage yard premises and was formerly used as a car storage house. Prior to that time it was part of a manufacturing plant acquired some years ago by the company. The building was not, therefore, built primarily for a stock department, but has been adapted for this purpose by the construction of bins, shelves, racks, etc., and an office 10 ft. x 16 ft. in one corner. The stockroom is 100 ft. deep by 35 ft. wide with a concrete floor, and one track remains extending the full length of the room. This permits direct loading and unloading of heavy supplies.

All small materials such as crossarm pins, bolts, insulators, washers, nails, pinions, pipe fittings, trolley wheels, springs, etc., are stacked in bins varying in size from 36 in. x 36 in. to 7 in. x 11 in. These tiers of bins reach a height of 9 ft. Smaller articles such as carbon brushes, contacts, controller fingers, contact springs, trolley axles, etc., are stored in box compartments, 7 in. x 7½ in., and such articles as wood screws, rivets, ball bearings, etc., are kept in small drawer compartments. Large articles, such as crossarms, gear cases, meters, journal boxes, brakeshoes, lightning arresters, etc., are kept in sections, 52 in. x 64 in. on the opposite side of the room, while brooms, shovels, pails, etc., are hung conveniently on racks. Piping, trolley wire, etc., are stored on racks at the back of the room. Rolls of tar paper, asbestos paper and wrapping paper are held in convenient racks on the sides of the bins, and fire extinguishers are distributed in prominent places throughout the room.



THERE IS AMPLE SPACE TO PERMIT ALL SUPPLIES TO BE NEATLY ARRANGED

STOCK CARD WHICH MAINTAINS PERMANENT INVENTORY OF ALL ARTICLES

Corresponding to every bin identification card there is retained in the stockroom office a stock card such as is reproduced. This bears the same number as the identification card and a similar description of the article. The stock cards are indexed alphabetically according to the names of the articles recorded. The sample shown indi-

PURCHASING ORDER FOR SUPPLIES MADE IN TRIPPLICATE. ORIGINAL
AND THAT SENT TO STOREKEEPER SHOWN

MONTHLY RECORD OF MATERIALS TAKEN FROM STOCKROOM

At the end of every month the storekeeper fills out a material and supply sheet, showing all articles taken from the stockroom during the month. This is sent to the purchasing department where the prices are filled in and the record is used to ascertain the cost of operation of each department. The personnel of the stockroom comprises a storekeeper and one helper.

A railway to Kongozan, the celebrated mountain in Korea, is projected by a group of Japanese financiers. It is proposed to obtain power from the Kanko River. The length of the proposed line will be about 63 miles.

REQUISITION FOR SUPPLIES MADE ON PURCHASING DEPARTMENT BY
STOREKEEPER

TAG WHICH IDENTIFIES MATERIAL AS BEING IN OR NOT IN STOCK

Construction Features of New Cars Now Building at Detroit

Special Members Are Used in the Floor and Side Frame, and There Are No Bulkheads—The Arch Roof Is in Three Units Without Headlining—A Special Lighting System and Ample Ventilation Have Been Provided



NEW DETROIT MOTOR CAR BUILT IN COMPANY SHOPS

THE Detroit United Railway has entered upon an extensive car building program by which it expects to complete at the present status of labor an average of six or seven cars per month for an indefinite period. This work is being done in its spacious new shops at Highland Park which were especially erected with the idea of building cars for the company. It is assured that 100 city motor cars and 100 trailers will be built and as many more than this as seem to be necessary to meet the steadily increasing business of the company resulting from the rapid growth of Detroit. Twenty-five motor cars will be completed first and then fifty trailers, following which seventy-five more trailers will be built. At the present time several motor cars have been completed and placed in service and others are passing through the shops on the schedule mentioned. In addition to the above program the company is now arranging details for the construction of interurban passenger cars.

In connection with this extensive car construction program there are several features of interest concerning the construction details of the car. The various parts are built as units on templates and later assembled. The methods of construction will be explained in an article which will appear in a later issue of this paper.

The body bolsters are built up in truss type from $\frac{7}{8}$ -in. x 9-in. material as the top plate and 1-in. x 9-in. as the bottom plate. In the floor the end sills consist of two 3-in. channels bolted together 12 in. apart and separated by a plate. These

are reinforced by a No. 10 gage steel plate 26 in. wide, bent to a right angle and riveted to the side sills which are 5-in. x $3\frac{1}{2}$ -in. x $\frac{3}{8}$ -in. angles. The first three cross-sills back of the bolster consist of two 3-in. channels riveted back to back, while the three center cross-sills are 3-in. I-beams. All parts in the construction of the sides are riveted with $\frac{5}{16}$ -in. rivets; while all joints in sash and letterboard are acetylene welded and each post is welded at top and bottom to the letterboard and sash rest respectively.

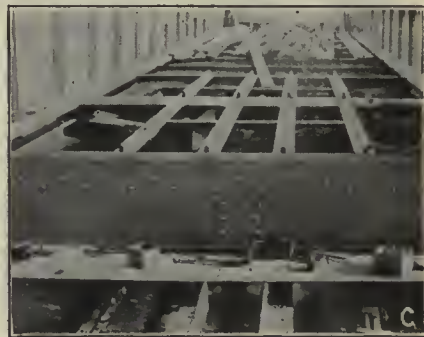
All vertical posts are of 2-in. x 2-in. T-iron and the side sheathing is No. 13 gage sheet steel. An angle, 3-in. x 3-in. x $\frac{5}{16}$ in. is used at the top of the letterboard as a support for the roof.

The top and bottom vestibule supports are $3\frac{1}{2}$ -in. x 3-in. x $\frac{5}{16}$ -in. and 4-in. x $3\frac{1}{2}$ -in. x $\frac{5}{16}$ -in. angles respectively and the bumper is a 5-in. channel. The drop platforms are supported by knees built up from two 3-in. x 3-in. x $\frac{3}{8}$ -in. angles reinforced with a $\frac{1}{4}$ -in. plate and the drawbar guide is formed by 4-in. x 4-in. x $\frac{1}{2}$ -in. angles.

THE CONSTRUCTION OF THE ROOF PERMITS INTERCHANGEABILITY

The arch roof consists of three sections, the hoods being separate units from the main roof. It is apparent that this permits quick and easy replacement from stock in case of damage. The longitudinal angles of the main roof are 2-in. x 2-in. x $\frac{1}{8}$ -in. and there is a $\frac{3}{8}$ -in. x $1\frac{1}{2}$ -in. steel carline over each vertical post in the side frame. Onto each of these are bolted a pair of wooden carlines and there are two intermediate wooden carlines between adjacent combinations of steel and wood. Poplar roofing $\frac{3}{8}$ -in. x 2-in. is used and covered with No. 6 canvas duck.

The flooring of the car is $\frac{1}{2}$ -in. x $3\frac{1}{4}$ -in. yellow pine, double thickness, separated by tar paper except at the center and ends where matting strips are placed. The furring of the posts above the window coping is $2\frac{3}{4}$ in. x $1\frac{1}{2}$ in., and below 2 in. x $1\frac{1}{2}$ in. and this fits over the leg of the T-iron post. The lining below the window is No. 16 gage steel. No headlining is installed and the entire car is finished in quarter-sawed oak, natural finish. All motor and resistance wires are placed in conduit. Railway Utility ventilators are installed in a large intake located in the front vestibule and in four exhaust openings in each side of the roof. Hunter illuminated destination signs are used, and



A—DETAILS OF SIDE CONSTRUCTION ON THE TEMPLATE WITH RIVETING PARTLY COMPLETED. B—METHOD OF ASSEMBLING SIDE FRAMES ON BODY BOLSTERS. C—THE FLOOR CONSTRUCTION INCLUDES SOME SPECIALLY DESIGNED MEMBERS



D—DETAILS OF VESTIBULE CONSTRUCTION. E—THE DROP PLATFORMS ARE SUPPORTED BY KNEES BUILT UP FROM ANGLES AND PLATES. F—THE VESTIBULE HOODS ARE SEPARATE UNITS FROM THE MAIN ROOF

the signal system includes a push button on each post. The heating system is of the Peter Smith hot-air type.

The upper sash of all windows is stationary while the lower sash raises. Pantasote curtains are used. Double folding doors for entrance and exit are provided at the rear, with a single, folding exit door at the front. All doors have wireglass in the lower panel and plain glass in the upper panel. Doors and steps are manually operated as a unit. There are seven transverse Hale & Kilburn hinge-type seats on each side. These are 35 in. wide, leaving an aisle space of 22 in. Each seat is supported by a single pedestal, the opposite end being screwed to the seat rail which is fastened to the side of the car. There are four longitudinal seats, those at the front of the car being each 7 ft. 6 in. long and those at the rear, 6 ft. 2 in. This gives a seating capacity of forty-six passengers. Leather hand-straps with sanitary covering are provided for standing passengers.

A feature of these cars is the absence of bulkheads. The rear bulkhead is done away with entirely and the front bulkhead has been replaced by pipe stanchions at the back of the motorman. On these stanchions are curtains so arranged that the motorman can draw them, to prevent the light from the interior of the car from interfering with his vision at night.

LIGHTING SYSTEM INCLUDES FIVE INDIVIDUAL FIVE-LIGHT SERIES

The lighting system includes 23-watt tungsten lamps without reflectors along each side of the ceiling, one on the back platform over the door, one outside over the front door, a five-light cluster over the fare box, one lamp in the Hunter destination sign and one Golden Glow headlight. These twenty-five lamps are arranged in five individual

five-light series, each on a separate switch. This arrangement has been made as a means of saving energy during such a crisis as was experienced last winter. One switch controls four alternate lights on one side of the ceiling and one in the cluster, a second the other four and one in the cluster, a third and fourth similarly for the other side of the car. Thus the fifth switch controls the headlight, the light over each door, that in the destination sign and one over the fare box. All switches are located on the front platform.

GENERAL DATA ON DETROIT UNITED DOUBLE-TRUCK CARS

Length of body over all.....	46 ft. 8½ in.
Length of body over corner posts.....	32 ft. 4 in.
Width of body over all.....	8 ft. 2 in.
Height from rail over trolley board.....	11 ft. 8½ in.
Height from rail to first step.....	14 in.
Height from first step to platform.....	13½ in.
Height from platform to car floor.....	11½ in.
Total weight	46,800 lb.

The car bodies are mounted on Standard 0-50 trucks equipped with four GE-203 motors. The motors are geared 15 to 69 and the control is K35G. Westinghouse semi-automatic air brakes are used with Peacock hand brakes as auxiliary equipment. The wheelbase is 5 ft., with 21 ft. 2 in. truck centers and 33 in. diameter cast-steel wheels on 4½-in. x 5½-in. axles.

Other equipment besides that already mentioned includes the Cleveland fare box, Tomlinson air and electric coupler, special life guards and Trolley Supply Company Ideal trolley catchers. Dimensions of the car not already given in the account of construction details are included in the accompanying table.

A description of the methods of constructing these cars will appear in a later issue.



G—STEEL CARLINE BOLTED BETWEEN TWO WOODEN CARLINES WITH PLACE FOR TWO SINGLE WOODEN CARLINES BETWEEN ADJACENT COMBINATIONS. H—INTERIOR OF COMPLETED CAR LOOKING TOWARD REAR. I—A SPECIAL FEATURE OF THE CARS IS THE VENTILATION INTAKE IN THE FRONT VESTIBULE. NOTE ALSO THE LIGHTING CONTROL SWITCHES

Heavy Freight Service on a Single-Track, High-Speed Passenger Line

Dispatch, Merchandise and Steam Road Interchange Freight Service Interspersed
with Frequent Multiple-Unit Passenger Trains—Road is
Member of American Railroad Association

By A. B. COLE

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

MANY electric railway operators have contended that freight operation is impracticable on single-track heavy interurban passenger lines. As evidence of what can be done under these conditions, the practice of the Monongahela Valley Traction Company, Fairmont, W. Va., affords an interesting example. This company is not only enjoying a very heavy passenger business, requiring the use of two-car multiple-unit trains all day on its main line, but is also earning a substantial revenue from hauling carload and less-than-carload freight in motor cars and trailers, and also from steam road interchange.

This company is fortunately located in the heart of the famous coal regions of West Virginia. The Fairmont-Clarksburg division passes through a territory which has been only slightly developed. The offices of the company are located at Fairmont, which has a population of

about 18,000, with more than 25,000 people within a mile radius of its business center. Fairmont is not only in the heart of the coal and natural gas supply, but it also enjoys low rate electric power, developed from the inexhaustible water power and natural gas of the region. These facilities have attracted a number of large industrial plants to the district, which contribute largely to the passenger and freight business of the traction company. Branching out from this Fairmont-Clarksburg division, which is 25 miles long, are branch lines reaching Fairview, Mannington, Lumberport, Wolf Summit, Bridgeport, Weston, and other towns.

In addition to the above division and its branches, the system includes the line between Beverley, Ohio, and Parkersburg, W. Va., a distance of 36 miles. This is known as the Parkersburg-Marietta division, and it includes



TERMINAL FACILITIES AND EQUIPMENT CONTRIBUTING TO THE PROSPEROUS PASSENGER AND FREIGHT BUSINESS OF THE MONONGAHELA VALLEY TRACTION COMPANY

the city lines in Parkersburg, W. Va., and Marietta, Ohio, making a total mileage for this division of 60.84.

The Monongahela Valley Traction Company also operates two electrified divisions of the Western Maryland Railroad, one extending from Hutchinson on the main line of the traction company to Wyatt, and the other from Everson up to Helen's Run. Both passengers traffic and merchandise freight are handled over these lines, both of which are heavy coal carriers. Naturally with the large number of mines located along these lines, there are many people to be served with transportation as well as a means of getting their food supplies.

Owing to the extensive operation of the Consolidated Coal Company in the valley of the Monongahela River, rapid transportation is essential, for there is an extensive movement of people between trading centers, and of freight from the larger cities to the mining communities.

From the foregoing general outline of the system and the territory served, it can readily be seen that the Monongahela Traction Company is admirably located for doing both a heavy passenger and freight business. In visualizing this business, it should be borne in mind that the entire property is made up of single-track line, and that altogether provision has been made for only 4 miles of siding track.

FREIGHT OPERATION

Three distinct classes of freight service are rendered:

- 1. Dispatch freight handled in the baggage compartment of passenger cars.
- 2. Merchandise freight handled in motor cars and box-car trailers.
- 3. Carload interchange freight handled between steam roads and industries along the line.

The organization which handles the freight service comprises a general freight agent, whose office is at Fairmont, and additional local personnel as follows: At the Fairmont freight station there are an agent and three helpers and an equal force at the Clarksburg station. At the latter station, the crew on the western division car assists with the loading of cars in the morning. It will be noted from the schedule below that this car does not leave Clarksburg until 12.20 p. m.

In addition to the Fairmont and Clarksburg depots there are three other agency stations—at Fairview, Mannington and Weston. There are no agencies at the other towns along the line. At these non-agency points freight must

be shipped prepaid. There is not much pick-up freight at any of these non-agency points, but whenever there is any the shipper meets the car. Also freight received at such points is received at the risk of consignees.

Most of the stations at the non-agency points consist of a platform and a small shelter roof. At some of the towns there is a small storehouse belonging to one of the mining companies, which has a door on the track side locked with a switchlock. Supplies are placed in such storehouses by the freight crew and the door locked, the representatives of the mining company then obtaining the freight from the wagon side of the building by unlocking another door. This arrangement eliminates the necessity of an agent at these mining town stations.

One of the significant practices in connection with the operation of fast freight service on the lines of the Monongahela Company is the use of four men on each train, which usually consists of a motor car and one or more trailers. Very often these cars are "set out" at some point, and then there are times when a large amount of less-than-carload freight must be handled on and off a train and yet keep in the clear of passenger traffic. This necessitates quick action. The company has found that the use of four men is a great expedient under these conditions.

The manner in which the freight service is handled on regular schedule is indicated by the following table of the four runs:

RUN No. 1			RUN No. 3		
Name of Town	Arrive	Leave	Fairmont	10.15 a.m.	
Fairmont		8.15 a.m.	Clarksburg	12.20 p.m.	2.15 p.m.
Clarksburg	10.20 a.m.	11.15 a.m.	Lumberport	3.15 p.m.	3.30 p.m.
Fairmont	1.30 p.m.	2.30 p.m.	Fairmont	5.15 p.m.	
Fairview	3.40 p.m.	4.10 p.m.			
Fairmont	5.30 p.m.				
RUN No. 2			RUN No. 4		
Clarksburg		8.15 a.m.	Clarksburg	12.25 p.m.	
Fairmont	10.30 a.m.		Weston	2.35 p.m.	3.15 p.m.
Mannington	12.50 p.m.	1.20 p.m.	Clarksburg	5.17 p.m.	
Fairmont	2.45 p.m.	3.20 p.m.			
Clarksburg	5.20 p.m.				

The traction company has steam railroad interchange facilities with the Baltimore & Ohio and the Western Maryland Railroads at seven different junction points. The following table gives an idea of the interchange business which the company handled during the first seven months of 1919:

Month	Locomotive No. 1000	Locomotive No. 2000	Total
January	43	32	75
February	33	106	139
March	49	107	156
April	98	152	250
May	276	122	398
June	229	91	320
July	171	142	313
Total (7 months)	899	752	1,651

In addition to many cars of mine supplies handled at the various interchange points, the traction company handles a number of tank cars to and from gasoline filling stations, located at Jackson Mills and at Hays. A construction company building a large plant besides the traction line has also contributed heavily to the interchange business.

EQUIPMENT USED IN FREIGHT SERVICE

The freight motive power rolling stock consists of five 20-ton capacity motor cars equipped with Westinghouse motors and HL multiple-unit control, and two 50-ton Baldwin-Westinghouse electric locomotives of the regenerative type which are used for handling the steam railroad interchange business. In addition to the above, there is one motor flat car which is used for handling rough freight and at other times is operated by the way department. In connection with the operation of the five motor cars,



MAP OF THE MONONGAHELA VALLEY TRACTION COMPANY SYSTEM

six 20-ton box-car railers are used. These have been found to be invaluable as they have added great flexibility to the handling of freight, in addition to the advantage they afford when used for carload movements.

As a member of the American Railroad Association the Monongahela Valley Traction Company enjoys the benefits of the per diem operation, accruing from steamroad interchange, as it owns, in addition to the electric railway rolling stock, 300 coal cars which are not supposed to be used for any other purpose than direct shipment of coal from its own mines to distant points and return.

A significant feature of the freight service of the Monongahela Company is that the freight claims have amounted to only one-half of 1 per cent.

How the Electric Railway's Dollar
Has Depreciated

Testimony in Public Service Railway Fare Hearing
Before the New Jersey Commission Brings
Out Some Interesting Figures

MUCH interesting information on a variety of subjects has been presented in the course of the hearings before the Board of Public Utility Commissioners of New Jersey on the Public Service Railway fare cases. Among other things, Mortimer E. Cooley, dean of the College of Engineering, University of Michigan, in his testimony relative to his valuation of the physical property of the railway, presented some valuable cost data. These data were designed to show the change in the purchasing power of a dollar and, in view of the large number of fare petitions now pending over the country and the need of publicity on the subject of railway costs, are of special interest at this time. In the accompanying table the items under the column headed "1910" represent the costs in 1910 of that amount of the several materials which could be purchased for \$100 in 1918.

Item	1910	Item	1910
Poles and ties	\$41.50	Galvanized sheets	\$56.00
Steel rails, heavy Bessemer ..	51.00	Electrolytic copper	52.50
Steel rails, light	41.00	Copper wire	55.00
Soft steel bars	52.00	Lead	62.00
Steel beams	51.00	Tin	38.00
Structural beams	58.00	Cedar poles, New York	43.00
Pig iron, Lake Superior charcoal ..	52.00	Cedar poles, 6-in. top, Michigan ..	26.00
Pig iron, foundry	58.00	Ties, white oak, St. Louis	54.00
Cast iron pipe, 6 in.	45.00	Ties, yellow pine, New York	67.00
Wire nails	53.00	Machinists' wages	64.00
Wire rods	57.00	Common labor	68.00
Galvanized iron wire	49.00	Carpenters' wages	72.00

In the following table the cost of lumber at the mills is compared on the same basis as the materials in the previous tables.

Kind or Lumber	1910	Kind of Lumber	1910
Oak	\$61.50	Douglas fir	\$55.00
Maple	62.50	Hemlock	57.00
Ash	62.50	Yellow pine	48.00
Beech	54.25	Spruce	60.00

A little study of the table shows, as was brought out in the testimony, that the American dollar of 1918 "had a purchasing power about equal to the Mexican dollar of 1910."

The effect of the higher unit costs now prevailing on the reproduction cost of the Public Service Railway's property was also shown. On the basis of unit costs secured by averaging prices for the five-year period 1911-1915 inclusive, the reproduction cost of the property, as of Dec. 31, 1915, was \$79,318,040. Using the average prices for the five-year period, 1914-1918 inclusive, the reproduction cost was \$91,424,350. For the prices, prevailing during 1918, however, it was \$117,890,529. These figures do not include development costs, which records show to be \$16,247,369

for the period of 1903 to the date of the hearing. Book records also show that \$7,993,092 has been put into the property since Dec. 31, 1918. This sum added to the reproduction cost, exclusive of development charges, on the 1914-1918 unit cost basis amounts to \$99,417,442, or in round figures to \$117,000 per mile of track. In the course of the hearing this cost was compared with per mile cost of \$138,000 for the San Francisco Municipal Railway and the Detroit United Railway valuation of \$110,734 per mile of track. It was also shown that 600 miles of the company's total mileage of 850 passes through paved streets involving 2,654,412 sq. yd. of paving. The reproduction cost of this paving amounted to \$5,572,000, which with other paving required by municipalities totals up to a grand total of \$6,105,000. This gives an average of \$7200 per mile of track.

Overhead percentages used in the appraisal were 7½ per cent for contingencies, 5 per cent for engineering and superintendence on way and structures and 2 per cent on equipment, and 2½ per cent for legal and administrative expenses.

Prof. H. C. Anderson, also of the University of Michigan and Dean Cooley's assistant in the valuation work, in his testimony presented the following overhead expense data on trolley wire:

Labor of erection	\$28 per mile.
Purchasing expense	1 per cent of material cost.
Material yard expense	½ per cent of material cost.
Insurance	4 per cent of labor cost.
Time keeping and accounting	½ per cent of labor and materials cost.
Commissions	5 per cent of labor and materials cost.

He also estimated that the reproduction cost would have been \$5000 per mile of track greater had it been necessary to include power-house costs.

Letter to the Editors

Zone Fares vs. Multi-Fares in New York

BROOKLYN, N. Y. Nov. 8, 1919.

To the Editors:

Those who have been declaiming loudly that the zone fare will never have a chance in Greater New York are asked to contemplate a couple of sample results that have followed the splitting up of the great consolidations into their intermediate or even original constituents. In the two instances which are presented, names are purposely omitted but the distances given are approximately correct.

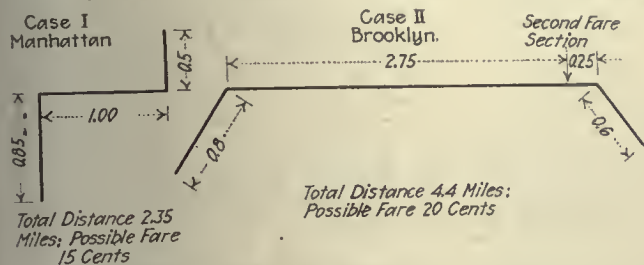
The writer had some business to transact on Broadway, Manhattan, then wished to proceed north to the theatrical district, then east across town and then north. The length of the first lap was 0.85 mile; of the second, 1 mile, and of the third 0.5 mile. Each lap was served by a car route so that walking was unnecessary.

In the old days, the total fare for this trip would have been just 5 cents, because a double transfer was granted to a destination in the same general direction—in this case north. Today, this trip would cost 5 cents per lap or a total of 15 cents. A 6-cent flat fare would make this 2.35 miles cost 18 cents and a 7-cent flat fare, 21 cents. Obviously, none of the three fares given would appear reasonable to the public. In this case, the writer rode two of the laps and walked the third, his decision in each case depending upon the frequency of service. If others were swayed by the same motive of saving time, it would be fair to assume a return of 10 cents but no more from this particular combination.

If a zone fare with a 3-cent minimum for 1 mile or less was applied to this case, the total fare possible would be

only 9 cents; but there would be far less boycotting of lines by prospects for two or more laps, so that the net result would be at least as good as getting two 5-cent fares from a smaller number of riders. No allowance is made here for the traffic that would be created by inaugurating a lower minimum fare in this densely-populated portion of the Borough of Manhattan.

The second case, which was in Brooklyn, illustrates a still more painful result of the break up of the holding company there. In that case, too, a three-lap journey was undertaken. The first stretch was 0.8 mile long, the second 3 miles long, the third, 0.6 mile long. An interesting complication was that the intermediate stretch is a double-fare line, a second fare being charged at the old city boundary. At first, even, it was necessary for passengers



SAMPLE RIDES AND FARES IN NEW YORK

to pay this second fare on a second car, but now a through service is given and the second nickel is collected en route. The former fare for the entire journey was 5 cents, but the present fare for the entire distance would have been 20 cents. As a matter of fact, it proved faster to walk the 0.75-mile and 0.6-mile laps than to wait for a car, nor did it seem good sense to pay 5 cents to ride over the 0.25-mile section. Hence, the actual ride was over the 2.75-mile section and the fare spent was 5 cents. With a base zone of 3 cents a mile thereafter, the cost of the ride actually taken (2.75 miles) would have been 9 cents and of the whole ride would have been 15 cents, against the illogical and actually non-collectible multiple fare of 20 cents.

In making these comparisons, of course, the writer is offering no criticism of any of the operating companies inasmuch as they are not at liberty to institute a genuine zone fare. The parallels are drawn to show how absurd and unjust such multiple fares are in comparison with the zone fare that begins low enough to catch the walker.

BROOKLYNITE.

National Research Council Expands Activities

THE Division of Industrial Research of the National Research Council is arranging for the formation of a co-operative association to plan and support fundamental researches in alloys. Although much valuable work has been done in this field by scattered investigators there is no doubt that a well-planned and co-ordinated effort by a co-operative association working under the general guidance of the National Research Council and composed of specialists representing both the manufacturers and the more extensive users of alloys can produce additional results of great importance.

It is planned to create a special scientific staff composed of a director and assistant director of research and a group of scientific investigators and technical experts who shall give their whole time to the work. To finance the organization each member of the co-operative association will pay \$1,000 a year, and all contributing members, who may be either alloy manufacturing or using individuals, firms or companies, are to benefit alike by the results of the researches.

Association News

1920 Mid-Year Conference

Cleveland, Ohio, the Place, Jan. 8, 1920, the Date
—Tentative Program Announced

THE committee on location and date, of which J. J. Stanley is chairman and S. M. Curwen and Lucius S. Storrs are members, have selected Cleveland for the location of the annual mid-year conference of the American Electric Railway Association on Thursday, Jan. 8, 1920. No selection has as yet been made as to the hotel or hall where the meetings are to be held.

The dinner will be in charge of a special committee, which will arrange all details including the program. Secretary Burritt advises that the personnel of this committee will be announced next week.

The tentative program for the meeting, which will be in two sessions, includes subjects of vital importance to the electric railways. At the morning session Williston Fish of Pittsburgh will present a resolution on depreciation and speak for it. This will be followed by three papers, each of which will discuss the resolution, after which discussion from the floor will be allowed.

At the afternoon session the main speaker will be Edwin Gruhl, of New York, who will address the conference on "What a labor contract should contain." This subject will likewise be discussed by others.

Other subjects that will be presented include reports from the committees on revision of dues, and changes in the constitution and by-laws. Due to the fact that in the past there have been numerous inquiries as to why more frequent conferences have not been held by the Association, a part of the afternoon session will be devoted to a discussion of this question, including the matter of speakers and subjects that will be of interest to the industry.

Toledo Men Entertain at Sylvania

ON OCT. 15 the "Rail-Light" orchestra, the company section glee club, and other members of the Toledo Joint company section went from Toledo to Sylvania on two special cars and gave an entertainment for the benefit of the employees of the Toledo & Western Railway.

Besides musical selections and recitations, the program included talks by members of the section on the benefit to be derived from membership, and Chairman Sommerville gave an account of his trip as section delegate to the Atlantic City convention of the American Association.

Chicago Section Elects Officers

AT the meeting of company section No. 6, consisting of employees of the Elevated Railroads of Chicago, held on Oct. 21, Charles H. Jones, recently appointed to be electrical engineer of the company, was elected president of the section. Other officers elected were as follows: Vice-President, W. C. Kelly; secretary-treasurer, M. W. Bridges; librarian, W. J. Boucher, and director for a two-year term, B. P. Rourke. With the exception of a talk by Miss Esther Burkett, of the "Loop" transportation department, on her work with the Red Cross and the Y. M. C. A. in Europe during the war, the program was entirely of an entertainment character. Luke Grant, manager publicity department, proved to be a very successful story teller.

News of the Electric Railways

FINANCIAL AND CORPORATE . TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

A Get Acquainted Party

President Kealy Gives Dinner To Directors and Officials of Kansas City Railways in Honor of New Members

Phillip J. Kealy, president of the Kansas City (Mo.) Railways, gave a dinner on Nov. 12 at the Hotel Muehlebach to the directors and officials of the company. The Mayors of Kansas City, Mo., and of Kansas City, Kan., and representatives of the local press were also invited to attend. There have recently been several changes in and additions to the staff of operating officials and the dinner was primarily for the purpose of promoting acquaintance and co-operation.

PRESIDENT KEALY URGES CO-OPERATION

Following the dinner President Kealy outlined the purpose he had in mind in asking those present to attend. He placed particular emphasis upon the necessity of co-operation by the public, the management, capital and the employees. He then reviewed briefly the operating and financial conditions of the company covering the past few years. He said that the last strike had cost the company \$1,500,000, but that the benefits which had resulted were worth the expense and could not have come about in any other way.

The work of building up an entirely new operating organization has been tremendous. To obtain 2000 satisfactory train service employees it has been necessary to employ more than 5000 men since Jan. 1. The labor turnover has now, however, been reduced in the transportation department to 50 per cent annually and it is expected that in a very short time this figure will be reduced to at least 30 per cent. At the present time there is a fine spirit of co-operation in the entire organization. For this President Kealy gave great credit to F. G. Buffe, recently made general manager. He also said that the success of the company in the strike was due in no small measure to the attitude of support at that time by Mayor Cowgill of Kansas City, Mo. He praised highly the work of the local Brotherhood and its able president, Warren Fisher. The membership in this organization has increased from seventy-five in November, 1918, to 2100.

OUTLOOK IS PROMISING

President Kealy said that the outlook for the company was promising. The extensive power plant rehabilitation work was nearing completion. The track had been rehabilitated and deferred maintenance accomplished so that now there remained only the necessary annual maintenance. The service had been greatly improved through rehabilitation in the shops and the purchase of new equipment, including safety cars. A receivership had been avoided and with the fare recently granted by the commission the company hoped to pull through intact and furnish to the citizens of Kansas City a service second to none.

In speaking as a recently elected director of the company, P. W. Gobel, Kansas City, Kan., praised the work which has been accomplished and the betterment of

service. He placed emphasis on the necessity first of good service and said that then the public will be willing to pay for the service which they receive. John H. Wiles, city representative on the board of directors, said that if only the information and facts which the directors have and understand could be placed before the public so that they also would understand there would be no hesitancy in giving the company the proper support and co-operation.

E. M. Harbour, city counselor, spoke highly of the betterment in service, praised both the company and the Mayor for the work done in breaking the strike and denounced radical unionism in general. He said he hoped the company would not find it necessary further to increase fares for this might drive people to the jitneys and good railway service was necessary to the growth and development of the city.

Each guest had a place card with his photograph and name thereon and each wore a ribbon on which were printed his name and position. After the speaking, there was a general get together and chat.

Way Out for Toledo

Mr. Doherty Advances Railway Settlement Plan Under Which City Is Expected to Act at Once

The city of Toledo, Ohio, was still without electric railway service when this was written. It is true that the prospects for the resumption of service had improved somewhat but all indications pointed the cars being idle for at least a month.

On Nov. 13 Mr. Doherty, head of the operating company in charge of the Toledo Railways & Light Company, stopped off in Toledo on his return East. He repeated that the resources of the company with respect to keeping the property going under the conditions that obtained had been exhausted and that the move in suspending service had only been taken when the firm's own opinion of what was proper and best to be done had been supplemented by the opinion of its local advisers and outside interest whose help had been sought.

Mr. Doherty did not leave the city, however, without holding out some hope. A summary of the proposal which he made is as follows:

1. That the City Council immediately enact both ordinances submitted to that body by the Toledo Railways & Light Company two months ago—the Taylor "service-at-cost" plan and the straight-out municipal ownership plan.

2. That organized labor, through the Central Labor Union, the newspapers, the commerce club and the public determine what is wanted in the meantime, so that when it goes to the polls to vote on the two ordinances he proposes it will give a decisive victory to one or the other.

3. That Mayor Schreiber immediately name competent persons to appraise the property of the company, the Doherty interests to pay \$25,000 toward this task.

4. That cars be put in operation as soon as the Council enacts the two ordinances and a valuation of the property is completed, the cars to be kept in operation until the voters determine which of the ordinances they desire.

On Nov. 17 it seemed that quick action was likely to follow. The city was reported then to be lining up its plans with a view to complying as quickly as possible with the ideas advanced by Mr. Doherty for an immediate appraisal of the railway.

New Franchise Suggested

The City Manager of Norfolk Advocates Local Railway Commission and Division of Earnings

Charles E. Ashburner, city manager of Norfolk, Va., has advanced for the approval of the City Council and the officers of the Virginia Railway & Power Company what might be termed a community-in-interest plan for stabilizing the relations between the company and the city. The plan has its basis in a public utilities commission for the city, to consist of six members who in addition to rendering assistance in the matter of operations in the city shall consider the advisability of revising the terms and conditions of all existing contracts between the city and the company.

AN EFFORT AT CO-OPERATION

It is explained in Mr. Ashburner's memorandum that while it is recognized by both parties that the power vested in the Council cannot be delegated to the railway commission and that while the officers of the company must accept their full responsibility, the plan is an effort on the part of those concerned in good faith to secure the assistance of disinterested and capable men, and that both parties pledge themselves to co-operate in securing the full benefits of action with the commission.

A memorandum is attached to the plan which suggests a possible working basis for a new agreement between the company and the city. It advocates a complete new franchise in place of the existing grants and outlines the following possible distribution of earnings:

Six per cent on the net operating revenue, after the payment of taxes, shall go to the city as compensation for the use of the streets.

Interest and the necessary sinking fund shall be paid on the lands outstanding against the Norfolk properties; the amount of said bonds to bear the same proportion to the total bonded debt of the Norfolk system as the average (running over five years), gross revenue of the division bears to the total gross revenue of the Virginia Railway & Power Company, from its street railway division.

Six per cent shall be applied as a dividend on the preferred stock of the company and 3 per cent on the common stock. Any excess net revenue shall be divided equally between the city the common stockholders and the employees, below and including the superintendent. The amount of stock on which a return is to be allowed is to be determined on the same basis as that fixed for the bonds.

MEASURE REGARDED FAVORABLY

The commission would be empowered to recommend and report in favor of increased charges for service rendered in transportation or otherwise. It would also have recommendatory powers with respect to service regulations, the expenditure of additional moneys for improvements and have power to recommend what it considered the best means of securing such additional capital as might be needed to carry out any recommendations made by it and agreed to by the company.

The vote on the first reading of the measure was unanimous. It is reported that no opposition to the measure is likely to develop.

Unanimous Report on Railway Relief

Special Massachusetts Commission Reports Against Public Ownership—Many Important Recommendations

The final report of the Massachusetts Street Railway Commission was filed with the clerk of the Senate on Nov. 15. It recommends sixteen legislative measures. An outstanding feature of this report is the fact that it is a unanimous one, signed by all the thirteen members of the commission. There are two supplemental statements only, in which a minority state a difference of opinion on certain points.

PERSONNEL OF COMMISSION

Charles G. Washburn is chairman of the commission, John D. Wright, secretary. The other members of the commission are, R. W. Boyden, Charles Giddings, David A. Belden, Charles S. Ashley, Leonard F. Hardy, Frank G. Allen, William H. McDonnell, David J. Maloney, William A. Kneeland, Benjamin L. Young and John J. Walsh.

The most important act proposed, provides for the establishment of transportation areas and the operation of electric railways under so-called public managers similar to measures in the Public Control Acts under which the Boston Elevated Railway and the Eastern Massachusetts Street Railway operate.

The bill contains twenty-three sections and under its provisions a town or city by vote of its citizens may petition the Public Service Commission of the State to establish a transportation area. If this petition is granted, the Public Service Commission is authorized to contract with any electric railway for the lease and use of its property within the limits of the transportation area. Upon the execution of the contract, and the acceptance by a majority of the holders of the common stock, and by the cities and towns petitioning and included within the proposed transportation area, the act becomes effective. Public control for a period of ten years from the time the act takes effect is provided for. Local managers, charged with supervision and direction of operation, are to be appointed by the Public Service Commission, subject to the approval of the Governor and Council of the State.

Provision is made for special assessment upon towns and cities within the transportation area in case of a deficit in operation. Where expense must be incurred for the rehabilitation of railways within the proposed area, provision is made for the railway to issue preferred stock at 6 per cent per annum to meet the maturing obligations. The bill also authorizes the State to exercise an option of purchase on the property at any time during the continuance of the contract.

CITIES SHOULD ASSUME SUBWAY RENTALS

Another important measure is an act to provide the assumption of subway rentals by the communities served. This act recommends that during the period of public control a sum equal to the amount of subway rental, including the amount to be paid by rental or otherwise for the use of the Cambridge Subway, be assessed upon the cities and towns in which the company operates.

An amendment to the Public Control Act under which the Boston Elevated Railway operates provides greater freedom for the trustees in fixing rates of fare and includes a provision whereby communities served in order to secure lower fare, may petition the Public Service Commission for the right to contrib-

ute to the cost of operation to an amount not to exceed two dollars per \$1,000 on their assessed valuations.

An act providing for the regulation of jitneys recommends making them common carriers and as such subject to public control. The commission has placed on record the opinion "that jitneys should be subject to the same control as that exercised over other classes of common carriers. It should be understood, too, that jitneys cannot at present replace the electric railway. We are satisfied that the unregulated jitney and the electric railways cannot exist as competitors in the same territory. The public must choose one or the other. . . . The jitney has run absolutely wild in many cities, often unregulated and irresponsible. As railways are regulated by the Public Service Commission, so should jitney service be supervised by public authorities. Unless this is done, service by trolley must be abandoned in much of the territory that is now served."

Among other important measures recommended by the Street Railway Commission are an act authorizing the State to purchase the Cambridge Subway; a bill which provides for the use of public credit to secure additional capital for the Boston Elevated Railway; special acts as amendments to the Public Control Act granting relief to the Boston Elevated Railway; an act for the relief of the Eastern Massachusetts Street Railway wherein the excise tax, amounting to \$277,000 shall be abolished and giving the towns and cities the right to contribute to the cost of operation in order to avoid the necessity of abandonment of certain of the existing lines of the company and to make possible lower fares.

The passage of legislation is recommended to provide for continuity of service on publically controlled electric railways. This bill if enacted into law would make it unlawful for any officers, employees, agents or other persons in service of any railway publically managed or controlled, to obstruct or prevent the operation of street railways by concerted action, combination or agreement. Provision is made in this bill for bargaining by the submission of any disputes relating to wages, hours of labor or working conditions, to a representative board whose decision shall be final. The bill also provides that in case any person in the employ of the publically controlled railway violates the provisions of the bill he shall be discharged from the service and thereupon shall become ineligible to re-employment or re-appointment in any capacity in that service for a period not exceeding one year.

PUBLIC OWNERSHIP NOT FAVORED

The majority of the Street Railway Commission does not favor public ownership. As regards the Boston Elevated Railway the report states that the majority believes it wise to give the present experiment of public management a longer trial. It says: "The Public Control Act has been in operation for a little over a year under the most unsettled business conditions. Already the revenue derived from the 10-cent fare is deemed by the trustees adequate to meet the obligations of the road. Further experience may make it clear that a readjustment of fares, through the creation of a zone system, will make possible a materially lower basic fare. The effect of removing some of the burdens now imposed through taxation and otherwise if our recommendations be adopted, is yet to be determined. The State of Massachusetts now has public control which could not be made more effective by public ownership."

Respite Granted Denver

Mayor Signs Six-Cent Fare Ordinance—Wage Question to be Submitted to Arbitration

Mayor Bailey of Denver, Col., on Nov. 12 signed an ordinance authorizing the Denver Tramway to charge 6-cent fares on its Denver City lines. The ordinance had been passed by the City Council on Nov. 10 in an effort to prevent a strike of the company's employees, who had threatened to walk out unless they were granted an increase in pay. The 6-cent fare became effective at midnight on Nov. 14.

Mayor Bailey approved the ordinance following the signing of an agreement between company officials and employees in which both sides undertook to abide by the award of a board of arbitration as provided in the contract now existing between the company and the union. The suggestion for such an agreement came from the Mayor, who had refused to sign the ordinance unless the company first came to an understanding with its employees.

Negotiations looking to the settlement of the wage controversy were scheduled to begin on Nov. 14 on the understanding that there should be no suspension of operation. The men are now receiving 48 cents an hour and are demanding 70 cents an hour. Any increase awarded by the board of arbitration is to take effect on Dec. 1. The company contends that it cannot raise wages above the present level, even under a 6-cent fare.

The Denver City Council took action to relieve the tramway situation caused by the rejection of both the cost-of-service and the elastic 6-cent fare plans at the poles at a special election on Oct. 22. The company had insisted that it must have relief in the shape of higher fares. The action of the voters in denying its appeal was announced in the issue of the ELECTRIC RAILWAY JOURNAL for Oct. 11, page 730.

Following defeat of both plans by popular vote, the company took steps to secure relief in some other way. The carmen, who were demanding further wage increases, were told that, unless fares were advanced, their pay would be lowered instead of being raised. The strike threat followed.

Confronted with the prospects of an immediate strike of its carmen, the company on Oct. 27 began circulating petitions for an initiated ordinance which would permit it to charge 6-cent fares under practically the same conditions as those provided in the temporary ordinance passed at the time of the strike threat last July and due to expire on Oct. 29. On the same day Mayor Bailey issued a statement with reference to the tramway situation, in which he said:

At the election held Oct. 22 last the people voted down both propositions presented for the settlement

of the tramway question. Therefore, on Oct. 29 the tramway fare reverts to 5 cents. There is much said in the public press and much talk outside of it about a strike of tramway employees and an interruption in the tramway service.

Under the state law thirty days' notice is required to be given before there is a change made in wage conditions—that is, before a reduction can be made in wages by the tramway company. I believe the tramway company will comply with this law and that, therefore, no strike is imminent.

I shall use every effort to see that the law is enforced whatever may occur and every endeavor to see that there is no interruption in transportation service.

It is impossible at this time to say what will be necessary to be done. I am watching developments carefully and am giving them full consideration and at the proper time will take such steps as may be necessary fully to protect the citizens of Denver in obtaining adequate transportation facilities.

To bring an initiated ordinance before the City Council required the signatures of 5 per cent of the registration at the last mayoralty election. On this basis the company had to secure 2700 signatures to initiate the proposed ordinance. Even if the plan worked according to schedule there would necessarily be a lapse of twelve days between the expiration of the temporary ordinance and the earliest date on which the permanent one could go into effect.

The ordinance as passed by the Council on Nov. 12 and later signed by the Mayor, provided that the company shall be allowed to collect a 6-cent fare with a 3-cent fare for children and free transfers. The right to repeal or change the provisions of the ordinance is specifically reserved to the city. Section 6 states that the passage of the ordinance was necessary for the preservation of the public health and public safety. Provision was made that it should become effective immediately after its signing and publication.

MAYOR STATES HIS CASE

Before signing the ordinance Mayor Bailey demanded that the tramway officials consent to examination of the company's books from time to time to ascertain the financial results of the 6-cent fare. To this proposition the company consented. The examinations are to be made by the city auditor, assisted by two other certified public accountants appointed by the Mayor.

In a statement issued at the time of approving the ordinance Mayor Bailey called attention to the fact that the law was subject to repeal by the Council or the voters at any time. He declared that if examination of the company's books revealed that a return to a 5-cent fare was warranted at any future time, he would take steps for the repeal of the ordinance.

He explained, in reference to his campaign pledge for a 5-cent fare, that, under existing conditions, the people would rather pay a flat 6-cent fare than to submit to the inconvenience of a strike.

Mayor Bailey's statement follows:

I have this day approved an ordinance passed by the City Council providing a 6-cent fare for the Tramway Company. I think the people are entitled to know the reason for this action. The employees recently demanded an increase in wages from 48 cents to 75 cents per hour, and a few days ago, by a vote of 832 to 2, voted to strike unless they could obtain some satisfactory adjustment of wages with the company.

During the campaign at which I was elected I promised the people that I would repeal the 6-cent fare ordinance, then in effect; and promptly kept my promise. After the 5-cent fare went into effect a dispute arose between the Tramway Company and the employees over wages and a strike resulted. In order to settle this strike and get the cars running a temporary arrangement was made by which a 6-cent fare was continued for a period of ninety days.

During that time there was submitted to the people, at a special election, two propositions for a settlement of the question, both of which were defeated because under the operation of either plan it was possible for the fare to go above 6 cents.

In view of the previous strike, and the demand of the employees for a second increase in wages, now pending, and the inconvenience to the people of the city which would result from a failure to have street car transportation, I believe if a flat 6-cent fare plan had been submitted to the people that it would have been carried by the people.

Since the temporary 6-cent fare, which was granted after the strike, expired on Oct. 29, last, the Tramway Company has been operating on a 5-cent fare. The problem has been an extremely difficult one to handle. It is one that has caused much grief, distress and discord in many other cities of the United States. I have been anxious that Denver should not suffer as other cities have suffered, and are suffering, from strife and bloodshed; and that serious inconvenience should not result from interrupted street car transportation during the severe weather which is now approaching. In view of these various circumstances, and especially the strike which has now been voted by the employees, and the likelihood that it will be necessary for the Tramway Company to pay a further increase in wages to its employees, and an agreement which I have this day obtained between the company and representatives of the employees to arbitrate the wage dispute, I deem it to be in the best interest of the people of the city that the 6-cent ordinance be approved by me.

Under all of the circumstances, many of which have arisen since I have taken office, I believe the people of the city would rather have a flat 6-cent fare than suffer the hardships of a long strike, which would undoubtedly result if the 5-cent fare remained in effect. In the action I have taken I have been guided solely and only in the interest of justice and what I conceive to be for the best interest of the people whom I represent.

The ordinance granting a 6-cent fare is subject to repeal by the Council or the people at any time, and I have the right to appoint a committee to examine the books and records of the Tramway Company as often as I deem it necessary so to do, and if by an examination of the financial affairs of the Tramway Company I find the financial condition warrants the restoration of a 5-cent fare I shall unhesitatingly make such a recommendation to the Council, or the people, as the case may be.

Detroit Rejects the Tayler Plan

After Tie Vote in Council Railway Commission, Which Had Recommended Tayler Proposal, Resigns

At a recent joint session attended by the Street Railway Commission of Detroit, Mich., Mayor Couzens and the members of the Council, the commission resigned in a body. The resignations were accepted, after the Council by a tie vote turned down a resolution favoring the adoption of the report of the commission recommending the Tayler plan of railway operation for Detroit. An amendment to the resolution was offered to the effect that the city would build all new lines and replace old ones when necessary with the ultimate result that the city would own the entire system.

COUNCIL DIVIDED

The Council was about evenly divided, part of the members standing with Mayor Couzens, who wants to bond the city for \$15,000,000 to build extensions. The plan on which cars would be run or who would operate them was not discussed by the Mayor further than to state that he did not favor any negotiation with the Detroit United Railway.

The break in the deadlock in the Council forestalled action by the committee of business men formed to take the railway situation out of the hands of the officials of the city. An ordinance was introduced by one of the Councilmen acting for the Mayor, and was ordered printed and laid on the table as required by the City Charter. It calls for an advisory vote on the Tayler plan on April 5, 1920.

It has been agreed by some of the contending parties that the Street Railway Commission should negotiate with the Detroit United Railway and report back to the Council the results of its negotiations. Then if their efforts resulted in a reasonable proposition, this proposition should be submitted to the people at the earliest possible moment.

OUTLINE OF MAYOR'S PLAN

In answer to the charge that he was blocking developments in the railway situation, the Mayor stated that under his plan the Department of Public Works would start digging and laying tracks on April 6, 1920, if the people on April 5, adopted the \$15,000,000 bond issue for new extensions, while if the Tayler plan were put up in the form of an ordinance and adopted, the Detroit United Railway would have to negotiate for the money before starting construction. Under his plan the Mayor also claims a saving of \$1,000,000 annually in interest charges. It is held that advocates of the Tayler plan believe that if that plan were submitted in the form of an ordinance, the people would adopt it, thinking to end the turmoil.

The Mayor's plan is to start negotiations immediately with the Detroit United

Railway to get the best possible agreement, if the people vote for the Tayler plan April 5, this agreement to be submitted to the voters the following November. In the meantime tracks could be laid.

The Corporation Council has expressed his opinion that the charter makes it mandatory on the Mayor to acquire, and failing in that to construct, own, maintain and operate a railway system. The Mayor says the mere fact that a portion of the citizens say the people have twice refused to acquire the railway system does not release him from his instructions in the charter to construct a system.

The incomplete returns from a referendum vote conducted by the Board of Commerce to obtain an expression of sentiment among business men show a large majority in favor of the Tayler plan. Abner Larned, former president of the Street Railway Commission, stated that unless the Council and Mayor give the people a chance to vote on the Tayler plan at the April election it is almost certain to be placed on the ballot as an initiated ordinance. The Mayor has announced that should the Council pass a resolution calling for the adoption of the report of the resigned commission, he would veto it. A two-thirds majority would be necessary in the Council to carry the resolution over the Mayor's veto.

Employees Appeal to Commission

The employees of the Utah Light & Traction Company, Salt Lake City, Utah, have filed with the Public Utility Commission of that State a petition urging that body "to hear and consider the financial condition of the company and the condition of the employees, and allow, if it finds the exigencies justify it, such raise in fares as will induce the company to permit some relief to the employees and at the same time increase the efficiency of the service."

A considerable part of the communication is devoted to a review of the needs of the men. In conclusion they say:

Your petitioners are anxious to avoid, if possible, the continuance of such conditions as may force the employees of the traction company to the desperation of seeking relief against the terms of the contract by quitting and interrupting service. We desire that conditions may be such that every contractual obligation of the present employees may be fulfilled, and we are appealing to you to assist us in the matter. We realize that without the consent of the company the existing contract cannot be reopened and that it is necessary, in order to secure such consent, that the Public Utilities Commission shall hear and consider the financial condition of the company and the conditions of the employees, and allow, if it finds the exigencies such as to justify it, such raise in street car fare charges as will induce the traction company to open the contract and permit some relief to the employees, and at the same time increase the efficiency of the service.

Bill Against Strikes

Provisions of Measure Urged for Enactment by the Special Commission in Massachusetts

In the account which appears on page 871 of this issue of the *ELECTRIC RAILWAY JOURNAL* dealing with the report of the special legislative commission on electric railways in Massachusetts, reference is made to the labor legislation suggested. The bill to prevent strikes, included in the labor legislation program, follows:

Sec. 1. It shall be unlawful for any officers, employees, agents or other persons in the service of any street railway in this Commonwealth, publicly managed or controlled, by concerted action, combination or agreement, to hinder, obstruct or prevent the continuity of service of such street railway, or to threaten such hindrance, obstruction or prevention.

Sec. 2. The duly constituted operating officers of any street railway system and every person or association of persons in its service, shall, by written instrument or instruments, agree to submit to arbitration by a board or boards, whose decision shall be final, to be selected as therein provided, every difference or dispute relating to wages or compensation, hours of labor or working conditions, and any disputes or differences that may arise in the course of the operation or management of such system, and to abide by the findings, determination or award of such board. Copies of all such written instruments shall be filed with the Public Service Commission.

Sec. 3. The board shall hear the parties or their representatives and determine all matters in dispute, and such determination shall be in force for such a period of time as the board may fix. To the extent that the matters in issue are controlled by statute or may require legislation the board may make recommendations to the General Court, with drafts of such proposed legislation as may be necessary to carry the findings or recommendations into effect.

Sec. 4. In case of the failure of the parties to complete the selection of an arbitration board in accordance with said agreement or to make provision therefor, within sixty days of a request by either party, or by the governor, for the selection of such a board, the Public Service Commission shall serve as such a board and shall exercise all the powers set forth in the preceding section.

Sec. 5. Any person violating the provisions of Sec. 1 shall thereupon be discharged from the service, and his continuance in such service, or his re-employment or re-appointment in any capacity therein for a period not exceeding one year, as the Public Service Commission may determine, shall be unlawful.

Municipalization Arranged

Canadian Border Cities Approved the Plan to Take Over Suburban Lines of the Detroit United

Delegates representing Windsor, Ont., and eight other border municipalities have unanimously approved plans for the purchase of the Sandwich, Windsor & Amherstburg Railway, a subsidiary of the Detroit United Railway, at a cost of \$2,100,000. Sir Adam Beck, chairman of the Ontario Hydro-electric Commission submitted plans, and as a result the project will be sent to the ratepayers for decision thereon, in an election to be held at an early date.

ANOTHER FARE QUESTION

It is understood that the taking over of the electric light and power plant owned by the company and valued by the commission at \$190,000, will be voted on by Windsor taxpayers only as a separate by-law, since the plant is located in Windsor and furnishes light and power for the Windsor consumers.

In explaining the proposed method for financing the purchase, Sir Adam Beck stated that the commission had been authorized to issue forty-year bonds, the only obligation incurred by the municipalities being the guaranteeing of the bonds. All expense, both original cost and maintenance charge, will be supplied by the earnings of the lines and paid by the car riders.

It is believed by the commission that the present rate of fare is sufficient to make

the railway a paying proposition, but in event it is not, a 5-cent fare will be charged, which it is believed will be equitable in view of the fact that extensions to the system will be made as soon as possible, to give adequate service to the people in need of it.

The cost of the system, which will be apportioned among the nine municipalities, also includes an item of \$250,000 for new lines. Windsor's share of the total cost is fixed at approximately \$745,000, or about one-third, the remainder to be apportioned among the other eight municipalities. In the event the by-law is defeated by voters in one of the municipalities concerned, it is believed that the road could still be purchased and taken over by the approving municipalities. In their order as to size of apportionment, the other towns included with Windsor are Sandwich, Sandwich East, Sandwich West, Walkerville, Anderson, Amherstburg, Ford and Ojibway, Ojibway's apportionment amounting to \$44,515.

SIR ADAM DEFEATED

Sir Adam Beck, chairman of the Ontario Hydro-electric Commission, was defeated at the recent election by a Labor candidate at London, Ont. It is said now that this may hinder the plan to purchase the Sandwich, Windsor & Amherstburg Railway. Sir Adam will have charge of the commission's business until the new government takes over the reins, but as the purchase of the railway serving the border municipalities cannot be made without backing from those who may constitute the government, the proposal to lay the plan before the ratepayers of the eight municipalities some time in December may be delayed, it is said.

News Notes

Mayor Suggests Railway Be Purchased.

—A by-law to authorize the purchase of the London (Ont.) Street Railway by the city will be submitted to the ratepayers at the next municipal election, providing the City Council adopts the suggestion of Mayor C. R. Somerville.

Row Over Municipal Procedure.—The Civic Board of Control of Toronto, Ont., broke up in a row on Nov. 6 after passing unanimously Mayor Church's motion to submit to the people the question of authorizing a commission of three, appointed by the Council, to operate the Toronto Railway when the city takes it over in 1921. It was only by three to two, however, that the Board adopted the Mayor's draft act appended to the resolution for submitting the question. Comptroller Cameron accused his colleagues of having "it all cut and dried."

Railway Offered to City.—The City Council of Columbia, S. C., has called a meeting to consider an offer submitted by E. W. Robertson, president of the Columbia Railway, Gas & Electric Company, to sell to the city the railway system now operated by that company. By authority of the board of directors of the company, the offer was made to sell the railway system to the city on the basis of its present valuation. What action the City

Council will take is not known. Mayor Blalock stated that a vote of the people will be had if the City Council favors the proposition.

Inductive Interference Alleged.—The Board of Commissioners of Sullivan County, Indiana, has filed suit in the County Circuit Court against the Terre Haute, Indianapolis & Eastern Traction Company, asking that the franchise under which the company is permitted to build lines for transmitting high-voltage current along public highways in the county be annulled and that the company be enjoined from using the public highways for this purpose. The matter seems to hinge upon whether the company should have an exclusive right to use the highways for high-voltage purposes. It was alleged that a telephone company using the same highway cannot transmit its messages because of interference from the high voltage of the railway.

Union Fails to Coerce City.—City Attorney John R. Dillard has approved the position taken by Mayor J. O. Stahlman of Bluefield, W. Va., relative to the protest made by the Central Labor Union against the Appalachian Power Company in which the labor body asked that the city officially take action to have the men now employed by the company in the operation of its cars removed, on the alleged ground that they are inexperienced and dangerous to the public. In his opinion the city attorney said that the city could not have anything to do with the controversy between the Appalachian Power Company and its former railway employees. In connection with the protest made by the Central Labor Union before the City Council, Attorney Dillard said the Appalachian Power Company was responsible for any damage done to the public in the operation of its cars and that the city could in no way interfere, nor under the circumstances would it attempt to interfere, with public utility corporations.

Suggests Plan to Prevent Utility Strikes.—The Merchants' Association of New York has submitted to the Chamber of Commerce of the United States for referendum vote a plan for the prevention of strikes by employees of public utility corporations. The plan, which was submitted to the Merchants' Association by Henry R. Towne, chairman of the board of the Yale & Towne Manufacturing Company, provides that service shall be regulated by law, so that each person who enters employment shall be legally obligated by contract to continue for a specified time. During the prescribed period he cannot lawfully quit nor may he be discharged except according to the provisions of the contract. Resolutions adopted by the Merchants' Association say that the functions of public utilities, exercised only by public authorization, become public agencies and should be controlled by law in the public interest. To obtain this result, the resolution says, continuous and uninterrupted operation must be maintained, and therefore strikes should be guarded against by law.

Program of Meeting

New York Electric Railway Association

The New York Electric Railway Association will hold its twenty-third quarterly meeting and dinner at the Hotel Astor, New York City, on Dec. 10. The program of subjects to be discussed and the list of speakers have not yet been announced.

Financial and Corporate

Mr. Perkins Permanent Receiver

Robert W. Perkins, president of the Shore Line Electric Railway, Norwich, Conn., was made permanent receiver of the company by the Superior Court within and for the County of New London, on Nov. 14, 1919. The court ordered and adjudged "that four months from and after Dec. 1, 1919, he, and the same is, hereby limited for the presentation to said receiver of claims against said estate (plant), and all claims not so presented be forever barred, and that said receiver give notice to all parties concerned of said limitation and that all claims not presented within the time limited will be forever barred, and of the address to which claims could be sent to him by mail, by publishing said notice in three issues each of the *Norwich Bulletin* and *The Day*, newspapers published in Norwich and New London, and by causing a copy of said notice to be mailed, postage prepaid, to each known creditor, all on or before Dec. 1, 1919."

The receiver has announced that claims may be sent to him at Norwich, Conn.

Receiver for West Virginia Road

As the result of a suit by the trustees of the company, Aaron Garlow has been appointed receiver of the South Morgantown Traction Company, Morgantown, W. Va. Service on the line will be resumed immediately according to an announcement made following the appointment of the receiver.

The company recently made application to the State Public Service Commission for an increase in rates. A hearing was set for Nov. 12. The company has asked for an 8-cent fare with fourteen tickets for \$1 for adults and sixteen tickets for \$1 for school children.

Service on the South Morgantown line has been suspended for several weeks because of the inability of the railway to pay its outstanding bills. The service prior to that time, however, was subjected to occasional suspensions and was a source of annoyance to the people of Greenmount, South Park and South Morgantown.

Suit for Foreclosure Commenced

Suit has been started in the United States District Court of the Eastern District of Illinois, before Judge Evans, by the Northern Trust Company, Chicago, against the Aurora, Elgin & Chicago Railroad for the foreclosure of the first and refunding mortgage, amounting to nearly \$4,750,000. The court has issued an order extending the receivership of the electric railroad.

The mortgage of the company is dated July 1, 1906. It secured (originally) an authorized issue of \$25,000,000 of 5 per cent bonds due on July 1, 1946, but subject to call on or before July 1, 1911, at 102½ and interest. The Northern Trust Company, Chicago, is trustee. Interest is payable on Jan. 1 and July 1 at the office of the Citizens Savings & Trust Company, Cleveland, Ohio.

Of the bonds \$2,979,000 have been sold, \$4,628,000 are in escrow to take care of

underlying bonds and \$7,393,000 are being held to provide for future improvements and extensions.

In 1911 the authorized issue of bonds under this mortgage was reduced to \$15,000,000. Of the \$2,979,000 of these bonds outstanding on June 30, 1911, \$272,000 were issued against the Elgin, Aurora & Southern Railroad bonds acquired under sinking fund operations. The remaining \$2,707,000 were issued against extensions, improvements or betterments made or acquired since the consolidation.

Offer to Purchase International Bonds and Stocks Rejected

George F. Rand, chairman of the board of directors of the Marine Trust Company, Buffalo, N. Y., acting on behalf of a committee of Buffalo bankers and businessmen, on Oct. 3 made an offer to the bondholders' committee of the International Traction Company, Buffalo, to purchase \$17,000,000 of the International Railway of Buffalo stock and the \$5,000,000 underlying bonds, which carry control of the system.

Mr. Rand's offer to purchase was considered at several conferences at which Thomas E. Mitten, Philadelphia, a member of the International Traction bondholders' protective committee, was present, but it has apparently been turned down. Mr. Rand says he has withdrawn his offer.

In a statement in reference to the Buffalo traction situation, Mr. Rand says the attitude of the city officials toward the company and the antagonistic feeling of the public as evidenced by the recent election tend to make the outlook anything but promising for any prospective purchaser of the bonds.

Corporation Counsel Urges Consolidation

Among those in Washington who are urging the consolidation of the Washington Railway & Electric Company and the Capital Traction Company is Conrad H. Syme, corporation counsel of the District of Columbia. Mr. Syme made public some of his views on the matter in a speech which he delivered recently. He said that if the railways do not agree to a merger Congress should condemn and seize them. He favors stopping the taxation of all utilities. In this connection he pointed out that it is the consumer who ultimately pays the tax bill in increased charges for service.

He pointed out the essential differences between the two railways operating in Washington, drawing attention particularly to the great density of traffic and compactness of the system of the Capital Traction Company as opposed to that of the Washington Railway & Electric Company. The differences between the structures of the two companies had made it very difficult to decide the recent fare case, for it would not do to have two companies in a city, one operating at a fare different from the other.

Another matter to which he referred was the recent valuation report, digested previously in the *ELECTRIC RAILWAY JOURNAL*.

Brooklyn Deposits Urged

The work is well under way of organizing to protect the holders of securities of the companies included in the Brooklyn (N. Y.) Rapid Transit Company, now in the hands of Lindley M. Garrison as receiver.

On Nov. 20 it was announced that the time had been extended for the deposit of the first consolidated mortgage 4 per cent gold bonds of the Nassau Electric Railroad. The extended date is Dec. 15. Holders are urged to deposit, it being pointed out that they should be in a position to bring foreclosure suit and to make application to have the Nassau road operated separately if such independent operation appears desirable.

On the same day the holders of bonds secured by the first consolidated mortgage of the Brooklyn, Queens County & Suburban Railroad were urged to send their names to a committee headed by Haley Fiske, which committee has a deposit agreement in course of preparation.

Financial News Notes

Valuation Figures Disagree.—The engineers of the Board of Public Utility Commissions of Manitoba have completed their appraisal of the property of the Winnipeg Electric Railway. The value reported to have been found by them, exclusive of considerable realty, is about \$20,000,000. It is reported unofficially that the figure found by the company's engineers is about \$26,000,000.

First Indianapolis Dividend Since Reorganization.—At the meeting of the board of directors of the Indianapolis (Ind.) Street Railway, held at Indianapolis on Nov. 12, it was voted to declare a dividend of 1½ per cent for the quarter from June 1 to Aug. 31, 1919, on the preferred stock of the Consolidated Indianapolis Street Railway, payable on Dec. 1, 1919. It was also voted to send a circular letter to the stockholders of the old Indianapolis Street Railway requesting them to forward their stock certificates to the treasurer of the company and receive in lieu thereof an equal number of shares of preferred stock of the new consolidated Indianapolis Street Railway.

Indianapolis Bonds Cancelled.—Cancellation of the \$2,000,000 of bonds of the Indianapolis Traction & Terminal Company, Indianapolis, Ind., and of the old Indianapolis Street Railway held in the sinking fund of the Traction & Terminal Company has been completed, in compliance with an order of the Indiana Public Service Commission. Robert I. Todd, president of the company, has obtained the consent of 80 per cent of the bondholders of the Indianapolis Traction & Terminal Company and 65 per cent of the bondholders of the old Indianapolis Street Railway. The commission, in approving the reorganization of the railways of Indianapolis, directed that the bonds held in the sinking fund and on which interest was being paid, should be cancelled.

Traffic and Transportation

Rates in Gary Increased

Indiana Commission Grants Six-Cent Fares and Also Offers Advice About Regulating Jitneys

In an order which became effective on Nov. 1, the Public Service Commission of Indiana, acting on a petition of the Gary Street Railway, granted an increase in rates in Gary, Hammond and East Chicago from 5 cents to 6 cents and an increase in the rates between these cities from 10 cents to 20 cents. In its petition the company had requested permission to make a transfer charge of 3 cents. This was denied by the commission.

In petitioning the commission the company stated that no dividends had been paid on either preferred or common stock; that the company would in the near future be required to re-lay certain of its tracks and re-pave certain streets in the city of Gary at a cost of \$350,000; that the city was calling for further extensions; that during the war period the company had borrowed about \$170,000 which must be repaid in five annual installments; that increases in trainmen's wages between March 1, 1918, and July 1, 1919, averaged 48 per cent; and that the operating expenses would be increased \$20,000 a year.

The commission found it unnecessary to make a formal valuation of the property. The tentative estimate of the value of the property as of November, 1917, was used together with a list of the additions, extensions and betterments since made. On this basis the commission estimated the value of the property at from \$1,600,000 to \$1,800,000.

Using this estimate as a basis, the net operating revenue of the company would amount from 3.1 per cent to 2.74 per cent, respectively. The commission said:

Such a return is so inadequate as not only to justify a readjustment of petitioners' rate schedules, but to constitute a positive menace to the rapidly growing community served.

The company estimated that the increase in rates sought would result in an increase in revenue of \$72,000 per year. Referring to this the commission said:

This would yield a return of 7.57 per cent on a value of \$1,600,000, or 6.73 per cent on a value of \$1,800,000, neither of which could be considered unreasonable.

The commission expressed no doubt that increased cost of operation made impossible a continuance of the 5-cent fare. In the words of the commission the company "is confronted with the most formidable jitney competition in the State." The question was whether the institution of a 6-cent fare and a 3-cent transfer charge would result in driving traffic to the jitneys to such an extent as to result in a decrease rather than in an increase in revenue. The commission assumed the attitude that the 3-cent transfer charge, making the through fare 9 cents between points where a transfer would be needed, would have a repressive effect on traffic, and would at the same time create a 50 per cent discrimination between citizens traveling like distances.

The commission considered that a straight 6-cent fare should at least be given a trial and reports made during a period of sixty to ninety days. The commission said:

Without prejudging the test of the 6-cent fare without transfer, the commission is nevertheless fearful that it will be found to be insufficient provided the jitneys are permitted to continue to operate and skim the cream of short-haul traffic. The commission, however, is hopeful that the 6-cent fare will prove successful if there can be eliminated the \$100,000 gross loss of revenue per year which now goes to the jitneys.

The commission said further:

The time has come . . . when cities . . . must select between jitneys, which can and will serve only a few people, and low fares and good service on the railways, which are held responsible for constant operation over large areas, much of which operation is unprofitable.

Competitive conditions, are especially unreasonable in Gary. The results are that:

(1) The railway paves and maintains a large part of the street used freely by jitneys which deprive the railway of revenue.

(2) The people who ride on the railway pay higher fares than otherwise would be the case, to provide and maintain pavement for other transportation agencies whose operation tends to increase the fares of railway patrons.

The commission has no jurisdiction that will enable it to regulate street traffic in municipalities. In exercising its rate-making duties in this instance, it must provide \$100,000 in higher fares to be paid by the masses of people who do not own automobiles and who must use the street cars to cover revenues lost to the jitneys. The commission therefore feels justified in directing the attention of the city of Gary to the question of whether Gary shall have low street car fares for all, or jitneys for a few.

The commission also will suggest to the city of Gary for its consideration the possibility of an eventual return to a 5-cent fare by removing from the railway patrons the burden of providing funds for pavements which are used by the entire community including private pleasure cars and trucks.

In regard to an increase in fares between cities the company sought an increase from 10 cents to 20 cents. The fare which had been charged was a 5-cent fare in each city. There is, however, some thinly populated country between the three cities, and the company sought the privilege of charging the 20-cent fare in three zones, 6 cents in each city, and 8 cents between the cities. The evidence submitted by the company showed that the distance the passenger might travel between the center of two cities was more than 11 miles, at a fare of 10 cents. The commission contended that such a fare was not adequate. The commission held that the service was really interurban service, and that should interurban fares be charged the cost would be 28 cents. The commission therefore granted the increase with the specification that the 8-cent zone should be divided into two 4-cent zones.

Changes in Operation Proposed

The United Railways & Electric Company, Baltimore, Md., has decided upon several important changes in its operating methods. In the first place it proposes to experiment on one line with the plan of having two cars discharge and take on passengers simultaneously. Under the present arrangement the follower runs slow behind his leader, while the latter is loading and unloading and comes to a full stop only when the leader has pulled out. The change that is now proposed of having the two cars load and unload at the same time will in many cases eliminate a stop by the follower and should tend to speed up the service.

Another new plan is for putting in an express service on the suburban lines. A study is now being made of riding habits on these lines and an experiment with express stops is promised for one of these lines soon.

Tickets for Kansas City

By Popularizing Tickets Company Hopes to Retain Basic Seven-Cent Fare and Also Increase Riding

It is expected that by the first week in December the Wood fare boxes will be installed on all the cars of the Kansas City (Mo.) Railway and new methods of collection will then go into effect. The 8-cent cash fare, recently granted by the commission has not as yet been put into effect due to an agreement which was made with the city.

The railway is willing to continue selling transportation on a 7-cent basis, but is anxious to make the use of tickets much more general. To accomplish this the scale of fares ordered by the commission will be placed in effect and the cash fare will be 8 cents. A passenger wishing to buy return transportation or to pay for a friend can purchase two metal tokens for 15 cents while the regular patron can purchase tickets in strips of five for 35 cents or at the rate of 7 cents each.

To reduce insofar as possible the necessary work of the conductor he will sell the metal tokens only. The strip tickets will be on sale in quantities of five or any multiple thereof at some 400 locations throughout the city. This will very materially decrease congestion and delay at the boarding points and will thus be a direct benefit to the car rider by speeding up service. The fact that tickets will not be for sale on the cars will not be a hardship on the public as the selling points will be easily accessible to all.

Tickets will be placed on sale for a week or more in advance of starting the 8-cent cash fare. Their sale will be popularized by extensive advertising and by having extra men go through the cars in the mornings calling out the tickets for sale. It is believed that the tickets will appeal strongly to the public for both economy and convenience.

New Fares Work Well

After the first week of operation under a 7-cent fare, the Washington Railway & Electric Company and the Capital Traction, Washington, D. C., reported increased revenues of 9.5 per cent and 6.9 per cent, respectively.

The Washington Railway & Electric Company during the first week of November collected \$98,868 as against \$90,282 during the last week in October, when the fare was 5 cents. Taking the increased revenue of the first week as an average throughout the year, the annual increase in revenue to the company would amount to approximately \$445,992, or slightly more than half the amount which the Public Utilities Commission estimated would be necessary for the company to earn 6 per cent on its investment.

The Capital Traction Company after the first week of increased fares reported additional revenue of \$6,284 as compared with the revenue during the last week of the 5-cent fare. The gross revenue of the Capital Traction Company for the first week of November was \$97,814, while the revenue for the last week of October was \$91,530.

Both companies reported a decrease in traffic, despite the increase in revenue. The patronage of the Washington Railway & Electric Company during the first week of November was 8.1 per cent below that of the week preceding, while the Capital Traction Company experienced a decrease in traffic of 11.8 per cent during the same period.

Transfer Case Up Again

New York Supreme Court Will Pass Upon Commissioner's Authority to Make Order—Other Happenings in New York

Justice Delehanty of the New York State Supreme Court on Nov. 17 issued a writ of certiorari calling for a rehearing of the action of Public Service Commissioner Lewis Nixon of the First District in abolishing free transfers on the lines of the New York Railways and the Brooklyn Rapid Transit Company. Justice Delehanty issued the writ on the application of Corporation Counsel William P. Burr of New York City. Commissioner Nixon was given twenty days in which to file a return.

CASE WILL GO HIGHER

The case will be submitted to the Appellate Division of the Supreme Court, which will be asked to decide whether Mr. Nixon has jurisdiction to make an order annulling provisions in the franchises given by the city to the companies.

Mr. Nixon's order was made on July 17 last. Mr. Burr alleges that the order was unjustified and unwarranted by law, that it violated the contracts binding the companies to charge not more than a 5-cent fare, that the testimony taken by the Public Service Commission was inadequate to show what were the obligations of the traction companies, and that the city had no opportunity to submit testimony in opposition.

Mr. Burr holds that even if the commission had authority to increase the charge for a continuous ride it violated the law in acting without obtaining sufficient information.

Corporation Counsel Burr appeared before Justice Giegerich of the Supreme Court on Nov. 10 and asked that Commissioner Nixon be compelled to state in his return in the Manhattan & Queens Traction Corporation case whether he assumes to have the power to increase the fare on traction lines. Several weeks ago Justice Finch, on the application of Mr. Burr, issued an alternative writ prohibiting Mr. Nixon from taking any steps in a request from the Manhattan & Queens Company for permission to increase its fare.

Mr. Burr described the return of Mr. Nixon on the writ as incomplete and evasive, and said that he wanted Mr. Nixon to make a fuller return, and especially to make clear his state of mind as to his jurisdiction in requests for fare increases.

He told the court that as soon as Mr. Nixon became a Public Service Commissioner he assumed the right to abrogate free transfers, and to compel a transfer charge that cost the people of Manhattan \$80,000 a year and the people of Brooklyn \$1,200,000. He charged Mr. Nixon with having acted in violation of the decision of the Court of Appeals in the Quinby case, which stated that the commission had no power to increase fares that were fixed in franchises.

NEW YORK COMPANY NEEDS MORE REVENUE

Evidence that the New York Railways is still in need of income was indicated on Nov. 17 by notice served on the Public Service Commission by counsel for Receiver Job E. Hedges, stating that a motion would be made before Federal Judge Mayer on Nov. 24 for permission to abolish transfers between the lines of the company and three lines operated by the Third Avenue Railway system. The three are the Fifty-ninth Street, the Grand Street, and West Belt lines.

The petition to be presented to the court says that in the last fiscal year it cost the New York Railways 3.117 cents to carry each passenger, exclusive of taxes, rents, interest, dividends, and maintenance reserve. Counting in these the cost would amount to 4.088 cents. Counting the present rate of wages the cost would be 4.624.

The company receives 3 cents for each passenger transferred to its lines from the Fifty-ninth Street line, and the loss on each passenger is therefor more than 1 cent. Figures presented as to the traffic between the company's lines and the other two Third Avenue lines indicate a heavy loss on transfers.

The action of the Brooklyn City Railroad in collecting double fares on several of its lines, which were recently severed from the Brooklyn Rapid Transit System by Judge Mayer, has evoked many protests from Brooklynites. The company, which operates more than twenty trolley routes, contends that it has the right to establish zones with a 5-cent charge in each zone.

The collection of 10-cent fares on the company's Flatbush Avenue line was the cause of most of the protest by car riders. The company on Nov. 5 moved up the second fare point on this line from No-

strand Avenue to Foster Avenue and announced that, when a car reached this point it would be halted until the passengers already on board had paid the second fare. A number of riders refused to pay, causing considerable disorder and several delays.

Commissioner Nixon has taken under consideration the question of the company's right to charge the extra fare on this line. Following a hearing before Mr. Nixon on Nov. 7, the company and the city submitted briefs, that of the latter contending that the second fare was illegal. Mr. Nixon has not given his decision in the case.

Mayor Hylan's bus lines, established during the last two months in various sections of Manhattan and Brooklyn, have attracted the attention of the Federal Courts. Judge Mayer on Nov. 6 instructed counsel for Job E. Hedges to inquire into the legal right of the bus service to operate in opposition to the Eighty-sixth Street Railroad, a part of the Fourth & Madison Avenue line, a subsidiary of the New York Railways. Counsel were instructed to determine the probable effect of the bus competition on the company's earnings.

The city authorities have ignored commissioner Nixon's warning that the bus lines must secure certificates of convenience and necessity. The Secretary of State of New York has served notice that each bus must secure a state motor license or cease operation. The license fee ranges from \$40 to \$67.50.

Buffalo Wins Its Case

Commission Grants Company Seven-Cent Fare, Ending Long Fight for Increased Return—City May Appeal

After a fight in the courts covering a period of more than three years, the Public Service Commission for the Second District has handed down a decision allowing the International Railway, Buffalo, N. Y., to collect a 7-cent cash fare within the city limits and directing it to sell four tickets for 25 cents. Although the order allowed the company to put the increased rate in effect on Nov. 1, threatened appeal on the part of the city has led to three postponements. Stipulations entered into between the city and the company have put off the collection of higher fare until Nov. 30.

The International Railway is planning to use metal tokens. These will be sold by conductors. The company is preparing to spend \$50,000 re-arranging its fare boxes to fit the new system. The city wanted tickets sold, but the company opposed the proposal that the conductors be allowed to sell them.

In announcing the 7-cent fare decision, Charles B. Hill, chairman of the Public Service Commission for the Second District, said that the commission used as a basis for its order a valuation of \$18,000,000 as compared with approximately \$35,000,000 which the International Railway sought to have used as a basis for a return.

The 7-cent fare will remain in force for six months. At the expiration of that period the rate will revert to 5 cents, but if there is no change in conditions, the company may make application to have the higher fare continued in force. Similar applications may be made every six months.

The question of higher fares in Buffalo has been before the public for several years. In 1916 the City Council, believing the 5-cent rate to be too high, petitioned the commission to fix a just and reasonable rate. Owing to war conditions the

case remained unsettled for nearly two years. At the end of that time it was apparent that a higher rather than a lower fare was necessary to save the company from bankruptcy.

The Buffalo City Council in 1918 passed a resolution consenting to a fare increase, but at the referendum election which followed this resolution was vetoed. The company thereupon turned to the Public Service Commission for relief and, answering the petition of the city of Buffalo contended that the fare was too low. It, in its turn, asked the commission to consider the rates and to raise them in accordance with changed conditions. The commission refused to accept the answer on the ground that it lacked power to act in the case owing to franchise provisions which, it claimed, limited the fare to 5 cents.

FRANCHISE UPHOLD

The State Supreme Court thereupon granted a mandamus, the proceeding later being changed by amendment into one of certiorari. The Appellate Division annulled the ruling of the commission and remanded the case for hearing and decision. The case was carried on appeal to the Court of Appeals, which decided in an opinion handed down on July 15 last, that the commission had jurisdiction.

The Court of Appeals, in its decision, held that under the Milburn franchise agreement between the city and the International Railway the city transferred to the Legislature the power to adjust fares. This power later, the court held, was delegated by the Legislature to the commission when the Legislature passed the Public Service Commission Act of 1907. The court therefore ruled that in deciding in favor of the rate-making power of the commission it was enforcing rather than overruling the provisions of the franchise.

Lawrence May Be Carless

So Say Trustees of Bay State Street Railway Unless Jitneys Are Curbed Before Nov. 26

Unable longer to face unrestricted jitney competition in Lawrence, Mass., the public trustees of the Eastern Massachusetts Street Railway, the successor to the Bay State Street Railway, have notified Mayor John J. Hurley of that city that unless the municipality takes steps to curb the jitneys before Nov. 26, service will halt on all local lines on that date. The letter of the trustees, signed by Homer Loring, chairman, points out that the Lawrence district is operating at an annual loss, as based on the returns for the month of September, of \$300,000.

The statement of earnings for the Lawrence district for September, the first month of "Home Rule" operation, shows a loss of approximately \$25,000. The blame for this deficit is placed solely upon the jitneys. The trustees contend that but for the jitney competition, the returns would have justified a reduction of fare.

The letter of the trustees follows:

The public trustees of the Eastern Massachusetts Street Railway have just received from Manager John H. Hayes the first statement of earnings for the Lawrence district under the home rule plan, and we regret to inform you that the district during September failed to earn operating expenses and depreciation.

The loss was caused entirely by the unrestricted jitney traffic permitted by the City Council. A careful estimate of our employees shows that the unrestricted jitneys are entirely responsible for a monthly loss to this publicly-controlled street railway of \$25,000 per month or \$300,000 per year. But for this drain upon its treasury, the Lawrence district in September would not only have been operated without loss but the earnings would have been sufficient immediately to warrant a reduction in fares.

You are, of course, aware that in the establishment of the Lawrence district the public trustees have seen to it that only earnings and expenses in Lawrence and surrounding lines are taken into consideration in the determination of fares there. You also know that the public trustees have no funds available for the operation of any district at a loss.

The public trustees appreciate the earnest efforts of the Chamber of Commerce and Citizens' Committee to bring about reasonable jitney regulations, but the financial condition of the Lawrence district makes an immediate decision necessary. The time has come when Lawrence must choose between street railway and jitney service. The earnings in October were less than in September, and the public trustees are unable longer to run the district at a loss.

We are, therefore, obliged to notify you that unless effective measures to restrict the jitney competition are adopted by Nov. 26, street railway service on all local lines, and most of the interurban lines, will be discontinued on and after that date.

Segregation With Safety Cars

Race Separation Not Found Difficult in Raleigh—Some Cars Are Short-Routed

Seven safety cars have been operating on the lines of the Carolina Power & Light Company, Raleigh, N. C., for several weeks. There will soon be a total of fifteen such cars in service. The public and the trainmen have accepted them without complaint. The segregation of negroes has caused some difficulty, although it has brought no serious complaint from the white population.

There is a "Jim Crow" law in North Carolina requiring the negroes to fill the car from the rear and the whites from the front. This makes it necessary for the negroes to pass by the white people both boarding and alighting. There was some apprehension that the negroes would not go to the rear of the car but would take a forward seat. This has not happened to any appreciable extent.

The most difficult situation to meet has been in connection with the Hillsboro line, which is the heaviest traveled line of the company's system. It extends from a

good residential section at one end to a negro section at the other, passing a popular amusement park en route. On Sundays, particularly just after church time, the negroes fill the cars as they come from their end of town toward this park. White persons desiring to board a car in the downtown section at this time frequently find the car full of negroes.

To alleviate this situation, the company has followed the practice of turning certain extra cars short of the negro section, so that they are then available for the white passengers when they reach the downtown loading points. White people then finding a car full of blacks, understand that there will be another car very shortly which will not be thus loaded. There is, however, no law or rule to prevent a white person from getting on a car full of negroes if he wants to do so, provided the car stops for him.

Courtesy Campaign Started

Indianapolis Company Issues a Booklet Planned to Help Better Public Relations

The Indianapolis (Ind.) Street Railway has started a "Courtesy Campaign" for the benefit of the public and its employees. One of the principal thoughts behind the campaign was to bring about a better feeling and a more courteous attitude between the public and the car service employees. Bulletins have been placed in the various carhouses with instructions to the trainmen. A pamphlet headed "Courtesy" has been issued to all motormen and conductors. The text of the pamphlet follows:

Common courtesy is the business of every man who meets the public.

Courtesy becomes a part of his trade, to be applied in the face of resistance, the same as it is a part of a carpenter's trade to apply a jack-plane on cross-grained wood, knots and an occasional nail head.

The station foreman, inspectors, conductors and motormen, or any man whose business is to come in individual contact with the public, if he becomes skillful in his work, must learn to restrain himself from doing that which is every man's natural instinct to do in meeting discourteous, impatient and unreasonable people.

We can never make the public better by impatience. The average mechanic does the best he can with the material delivered to him and he does not destroy that which resists him. An experienced carpenter, for instance, does not get angry and throw his tools out of the window when he strikes cross-grained wood—he simply reverses the action of his tool. It is only the boy amateur who flies into a rage at resistance and pounds up that which he is attempting. Any man who comes in contact with the public will meet a lot of thoughtless people. Nearly all people are unreasonable at some time.

Few people are unreasonable at all times. The people who are cross-grained in the morning are frequently kind enough at night. Doctors say that the reason people are more irritable in the morning, or after they have been sleeping, is that their blood pressure is low—their circulation is not normal. People who are morning are frequently sorry for it by night. Temper and irritability in the case of most people are the results of defective nerves rather than unkindness of heart.

The station foreman, inspector, conductor and motorman who is able to keep his temper and his voice low, and maintain himself with calmness, has a powerful weapon in his own defense and with which to administer real punishment to his offenders. The man whose business it is to meet the public, who resists impatience with patience, and temper with calmness, is gaining the respect and sympathy of every witness of the situation, and the offender will regret his act in his first reasoning moment.

The prosperity of every institution patronized by the public is largely dependent upon the good will of the individuals who comprise the public. The increasing prosperity of an institution depends absolutely upon the good will of an increasing number of individuals, and these individuals include the impatient, the discourteous and the unreasonable, along with the patient, the courteous and the reasonable, all of which go to make up a composite—the public. In a street railroad, for instance, the station foreman, inspectors, conductors and motormen are the only points of contact between the public and those who manage the property for the thousands of stockholders who own it.

A few of the many ways that courtesy may be applied by conductors and motormen.

BY CONDUCTORS

By seeing that all passengers have ample time to board and alight from cars.

By answering all questions politely but never to carry on an extended conversation.

By calling all streets and transfer points loudly and distinctly.

By not losing temper in disputes with passengers over fares or transfers.

Transfers probably cause more dispute between conductors and passengers than any other one thing in their relations, so much so that we believe that conductors should be very careful of how they handle a situation of this kind. In case you feel that you should reject a transfer, notify the passenger quietly and politely, giving your reasons for not accepting transfer and further notify him that in case any mistake has been made by the company or its agents, it will be rectified by the superintendent if called to his attention.

BY MOTORMEN

By seeing jointly with conductors that all passengers have ample time to board and alight from cars.

By not passing up any one unless a car is following within a reasonable distance.

By always running car on schedule time so that a uniform interval between cars is maintained.

By running car carefully at all times thereby taking no chances on injuring person or property.

Transportation News Notes

Complain of San Pedro Service.—The Railroad Commission of California recently held a hearing on the complaint of the San Pedro Chamber of Commerce that the Pacific Electric Railway, Los Angeles, was not furnishing sufficient service in the water front district of San Pedro. Attorneys for the railway contended that lack of services was due to congestion along the water front and insufficient space to be used for local and interurban cars.

Relief from Bus Competition Denied.—The Pennsylvania Public Service Commission has denied a rehearing of the complaint of the receivers for the Pittsburgh (Pa.) Railways, against the Pittsburgh Transportation Company, which operates a line of auto buses in the city of Pittsburgh. The receivers charged in their original petition that the bus company exceeded its rights to the use of streets granted by the commission. Their plea for relief was denied.

Cars Unheated, Coal Saved.—The East St. Louis (Ill.) Railway is sending out all of its cars without heat until the present coal crisis is over. An average of six carloads of coal is consumed at the plant daily and it is hoped to reduce this consumption to four carloads daily by economy. Much of the power used by the company is supplied by the Keokuk Power Company, but it is impossible to secure all that is needed from this source and some must be supplied by the local plants.

Traffic Check in Birmingham.—A system of traffic checking has been installed by the Birmingham Railway, Light & Power Company, Birmingham, Ala. A crew of traffic checkers has been put to work. Traffic on the various lines will be checked up daily especially that at peak hours. Daily reports will be made and will be tabulated for weekly periods. The check is being made in accordance with the policy instituted by Receiver Lee C. Bradley and is expected to result in an improvement of the service. Congested conditions now prevail at the peak hours.

Personal Mention

Mr. Milliken Promoted

Appointed Manager of Houston Electric Company by Stone & Webster—Formerly at Houghton, Mich.

E. L. Milliken, until recently manager of the Houghton County Traction Company, Houghton, Mich., has been appointed manager of the Houston (Tex.) Electric Company by Stone & Webster. Mr. Milliken succeeds David Daly, whose appointment as manager of the Keokuk, Ia., properties of Stone & Webster was noted in a former issue of the *ELECTRIC RAILWAY JOURNAL*.

Mr. Milliken was born at Biddeford, Me., in 1888 and was educated at the University of Maine, from which he was graduated in 1908 with the degree of Bachelor of Science in Electrical Engineering. During his summer vacations from 1903 to 1908 he was employed in various capacities by the Westbrook Electric Light & Power Company, the Bangor & Aroostock Railroad, and the Massachusetts Telephone & Telegraph Company. Upon his graduation he joined the Stone & Webster organization, with which he has been continuously connected since 1908.

During September and October, 1908, he was engaged in the statistical department in the central office of the Stone & Webster Management Association. In November of the same year he entered the service of the Cape Breton Electric Company. During the first two years of his connection with the company he was clerk to the manager. For the next two years he served as superintendent of distribution and electrical engineer, also acting as superintendent of light and power.

In May, 1912, he became manager of the company. He retained this position for five years. He took an active part in the affairs of the Canadian Electric Railway Association, and was elected a member of the executive committee in June, 1917. In October of that year he was appointed manager of the Houghton County Traction Company and the Houghton County Electric Light Company, resigning to assume his present duties.

New Post for Major Gillette

Maj. George Gillette has been appointed to the newly created position of general superintendent of railroads of the Tidewater Power Company, Wilmington, N. C. Major Gillette began service with the company as an electrician's helper in 1904 and in 1906 became storekeeper. During this time he attended night school and then went to the North Carolina State College from which he was graduated in 1911 with the degree of Bachelor of Science in electrical engineering. He rejoined the company in 1912 as foreman of equipment and in 1913 was made master mechanic and, later, claim agent.

In September, 1916, he organized a volunteer company of engineers of which he was commissioned captain, spending six months on the Mexican border. Soon thereafter he was sent to France, where he served with the 105th Engineers of the 30th Division and later with the 6th Engineers of the 3rd Division, which formed part of the army of occupation. During this period he was promoted to

major and given command of a battalion. He was ordered back to Norfolk, Va., in July, last, where he acted as executive officer of the supply base there, receiving his discharge on Sept. 24. He returned to the Tidewater Power Company, on Nov. 7.

H. E. Rose, storekeeper for the Androscogin & Kennebec Railway, Lewiston, Me., has been appointed purchasing agent of the company.

L. A. Bansbach has resigned as local storekeeper of the Pittsburgh (Pa.) Railways to accept a position with the Lehigh Transit Company, Allentown, Pa., as general storekeeper.

J. F. Canfield, formerly auditor of the Ottumwa Railway & Light Company, Ottumwa, Ia., has been appointed auditor of the Union Light, Heat & Power Company, Fargo, N. D.

Samuel H. Mitchell, general manager of the Phoenix (Ariz.) Railway, has tendered his resignation to take effect as soon as present improvement plans of the company are carried out. Mr. Mitchell has been connected with the company for the last seventeen years.

C. H. Hardesty has been appointed traveling passenger and express agent for the lines of the Monongahela Valley Traction Company, Fairmont, W. Va. The position of traveling agent was recently created. Mr. Hardesty will make his headquarters in Fairmont.

Captain W. S. Wyche has resumed his duties with the Arkansas Valley Railway, Light & Power Company, Pueblo, Col., after service in France with the 2d Engineers. He was twice decorated for bravery, winning the Croix de Guerre with palms and a citation from General Pershing.

E. F. Taylor, general superintendent of the Southern Public Utilities Company, Charlotte, N. C., has resigned to accept a position with The Texas Company as engineer in charge of a railway lubrication department, newly created. The resignation was effective Nov. 1. Mr. Taylor will make his headquarters in New York.

R. L. Miller has succeeded Tully Bostwick as general passenger agent of the Northern Texas Traction Company, Fort Worth, Tex. He was at one time connected with the company's claim department, resigning two years ago to become assistant claim agent for the Galveston (Tex.) Street Railway.

William B. Hartshorn has succeeded Jacob T. Barron as head of the central division of the distribution department of the Public Service Railway, Newark, N. J. Prior to his new appointment Mr. Hartshorn was connected with the Bergen division of the company. He will make his headquarters at Elizabeth, N. J.

O. C. Macy, superintendent of the East St. Louis, Columbia & Waterloo Railway, who has been associated with this company as superintendent for the last five years, with headquarters at East St. Louis, Ill., has resigned to become connected with the Franklin-Ross Automobile Company, East St. Louis.

Roland P. Hall, who for several years has been assistant passenger agent for the Texas Electric Railway with headquarters at Dallas, Tex., has submitted his resigna-

tion, effective on Dec. 1. Mr. Hall will join the James P. Simpson Company, Inc., advertising agency, as vice-president. He has been active in advertising circles in Dallas for some time, having been chairman of the study division of the Dallas Advertising League.

F. W. Lachicotte, Jr. and S. L. Duckett of the Southern Public Utilities Company, Charlotte, N. C., have been made responsible for the engineering work formerly in charge of E. F. Taylor, general manager, resigned. Mr. Lachicotte will have charge of the electrical engineering work and Mr. Duckett, of the civil engineering work, particularly that pertaining to the construction of gas works. Both men have been connected with the company for many years.

C. C. Johnson, formerly purchasing agent and assistant to the general manager of the Virginia Railway & Power Company, Richmond, Va., has been made general superintendent of railroads in charge of transportation and shops of the Richmond division, thus assuming part of the duties of A. Taurman, resigned. Supervision of the shops and rolling stock on the Norfolk-Portsmouth division formerly under Mr. Taurman has been transferred to T. N. Jones in addition to his other duties as assistant general manager in direct charge of this division.

Patrick F. Sheehan, who for the last five months has been assistant division superintendent of the Eastern Massachusetts Street Railway with headquarters in Brockton, Mass., has been made division superintendent. Mr. Sheehan, for a number of years a leader of the state branch of the American Federation of Labor, until his appointment as assistant division superintendent had been president of the Brockton branch of the Amalgamated Association of Street & Electric Railway Employees of America. Upon assuming his new duties he automatically severed his connection with the union.

B. W. Frauenthal has been appointed general traffic agent for the United Railways, St. Louis, Mo. Mr. Frauenthal is one of the best known men in St. Louis and especially to the traveling public. For many years he was in charge of the Information Bureau at the Union Station. There he gained the name "Ask Me" Frauenthal by his knowledge of everything connected with timetables and rates and his willingness to impart the knowledge. He was later put in charge of the whole station, with the title general station agent. He resigned from that position to become connected with the United Railways. He will have charge of the readjustment of passenger fares and tickets, including charges for special service, mail and express charges, and will direct the development of traffic.

Obituary

Arthur E. Brown, disciplinary officer of the Detroit (Mich.) United Railway, was accidentally killed on Oct. 10 while on a hunting trip in the Upper Peninsula of Michigan. Mr. Brown joined the company twenty-five years ago as car repairer. He was successively promoted to carehouse foreman, motor inspector, division superintendent, and finally superintendent of employment. He had been disciplinary officer for more than a year.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER
SALESMAN AND PURCHASING AGENT
ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Steel Situation Shows Improvement

Pig Iron Sales Are Made at Advances of \$1.50 to \$3 Per Ton—Unfilled Orders Show Increases

Production in the majority of the steel mills is now 60 to 70 per cent of what it was previous to the strike. The steel and iron situation is gradually becoming better and conditions approximating those of normal are rapidly being reached.

SALES AT ADVANCE PRICES

Several large sales of pig and foundry iron have been made at advances of \$1.50 to \$3 per ton. Regardless of recent sales, pig and foundry iron are being quoted at Pittsburgh at the old prices effective since March 21.

Unfilled orders on the books of the United States Steel Corporation up to and including Oct. 31 show an increase of 188,030 tons compared with the September figures. The figures show the unfilled tonnage on Oct. 31 to be 6,472,668 as compared with 6,284,538 at the end of September. The October tonnage was higher than that of any month since January, 1919, and it is expected that the succeeding months will show increases even greater than those shown in the last few months.

COAL SUPPLY REPORTED LOW

Up to the present time, the iron and steel mills have not been handicapped on account of coal shortage. In most instances, steel producers had a fair supply of coal and coke on hand and in many cases actually controlled a considerable amount of tonnage mined by subsidiary companies. While some of the mills have only one to three weeks coal supply, the government authorities who are in charge of distributing the available coal supply will see that the steel industry operates, although it will not furnish mills with fuel until their present stocks are depleted. This is absolutely necessary on account of the selling price fixed on coal by the government, and the desire of the steel trade to convert it into coke for furnace use.

Rubber-Covered Wire Mills Well Booked

Heavy Ordering on Smaller Sizes Uses Up Day Capacity—Labor Condition Uncertain

Manufacturers of rubber-covered wire have been very busy since midsummer trying to keep up to the demand for the smaller code sizes. Factories as a rule are running to their capacity and in several cases are booked up to a comfortable day capacity for the remainder of the year on Nos. 10, 12 and 14. More business can be taken on by these mills, but only under conditions of night work if 1919 shipments are necessary. Large orders are being received for the heavier sizes of this wire, but still not in quantities sufficient to surpass current capacity.

Labor conditions have here and there been responsible for poor shipments, and

in some cases have caused shut-downs to the mills. Although these latter conditions have only recently been overcome, labor is still not giving full efficiency to its work. Full capacity is really appreciably below normal on account of this one feature, with no apparent relief in sight.

Prices have been holding steady on a 30-cent base, and until a further rise in labor, copper and cotton there seems no reason to expect a higher base.

Time to Order Track Tools for Spring

Advance of 10 Per Cent in Effect on Nov. 1—Deliveries on Some Lines Are Lengthening

Orders for track construction tools for spring work should be placed before the end of the year in order to insure delivery by the time the frost is well out of the ground.

While during the next four months there will not be sufficient track and other construction work to require a large volume of tools, it must not be forgotten that many of these tools are also required in building construction. Contractors with excavation work to start early will not wait until the last minute to order tools. Also if the railroads are returned to their owners of the first of the year they also will be in the market for tools.

PRESENT STOCKS MODERATE

Present stocks of picks, hammers, sledges, mauls, wedges, bars, tongs and miscellaneous track tools are only moderate and on account of present orders on hand, manufacturers are unable to keep them up to their expected capacity. Under normal sales, it is estimated that present stocks are sufficient to last sixty days.

Production is better now than for some time past. Several plants, recently tied up with strikes, have resumed operation and reports indicate that the men are working much better than before the trouble occurred.

Buying is regular and a considerable number of inquiries are being received. Although there are no large individual orders, sales are showing improvement. Sales for the first six months of this year are but slightly less than for the first six months of last year.

Prices have advanced approximately 10 per cent. This increase, however, was not unexpected and it is not known whether another advance will be announced before spring.

Reasonable deliveries on some lines can be made in thirty days. Picks, sledges, bars, chisels, tongs and mauls can be delivered in quantity from stock now although no promises are held out that these conditions will exist in another month. Six weeks ago, labor was slowing up manufacturing and causing longer deliveries but with the plants gradually returning to normal working conditions, it is expected that deliveries will be permitted to be made on some important tools now on order by the different companies.

Effect of Return of Steam Roads

Indication that Deliveries Will Be Lengthened and that Prices, Particularly of Premiums, Will Be Higher

Should the present plan to turn back the railroads to their owners Jan. 1 be realized the market for supplies used by both the railroad and the electric railways will probably undergo a marked change.

At this writing the railroads are sending out inquiries for large volumes of materials, principally track supplies, pending the return of the roads. So far as can be learned manufacturers are not eager to do business on this basis.

It is very evident, however, that should the roads be returned that these inquiries will result in considerable business. In that event the visible supplies will be quickly absorbed.

Some increases in price undoubtedly will occur. Even in lines where prices are not advanced, it seems probable that premiums for spring delivery will follow closely the return of the roads.

To those electric railways planning track work the situation is of considerable interest. Many railways, requiring only a small amount of such supplies rely on the stock of the jobber. Should the supply be tied up by the requirements of the steam roads the jobber will be forced, under all the rules of the game, to pay more for his stocks and these higher prices must naturally be passed on to the consumer. While of course the entire situation depends, on the action taking in Washington and therefore is uncertain, still there is sufficient cause to make preparations for requirements for the first half of 1920. Even if orders for future delivery are placed now and the roads are not returned, there is no loss to the buyer for all signs point to prices for the first half of the year at least as high as these now prevailing.

Scrap Prices Higher

Demand Is Strongest for Foundry Cast Scrap—Large Sale of Shell Scrap by the National Government

Scrap car wheels, cast iron and heavy steel scrap continue to advance. The market is less active in Pittsburgh than in East and South where the mills are bidding for heavy tonnages due to the scarcity of pig iron.

According to quotations on Nov. 11 wrought iron scrap is up 50 cents a ton, heavy steel and cast iron scrap have each advanced \$1 per ton, while car wheels are selling at an advance of \$3 per gross ton. The supply of available scrap is limited. Cast borings are being disposed of quickly at \$16 to \$17 a ton delivered, although there is little demand so far for turnings which are quoted at \$13 per ton.

Old material dealers have just purchased 141,000 tons of shell steel from the government. This represents all the material the Ordnance Department had left over in the different depots. About 50 per cent of this material, consisting of shell forgings, is reported to have brought \$24.50 per gross ton.

Rolling Stock

Tidewater Power Company, Wilmington, N. C., is in the market for four 50-ft. interurban cars to be equipped with two motors each and multiple unit control. Delivery is required in the spring.

Birmingham Railway, Light & Power Company, Birmingham, Ala., has been authorized to purchase 144 65-hp. motors. The General Electric Company and the Westinghouse Company will furnish the motors which will cost, including installation, approximately \$200,000. In addition trucks will be given complete overhauling.

Recent Incorporations

- Albright & Bruceton Railway, Albright, W. Va.—The Albright & Bruceton Railway with a capital stock of \$5,000, has been incorporated at Albright, W. Va., by E. G. Calfish, Albright, J. C. Calfish, F. C. Chapin, W. B. Fulton and Fred J. Maurer, all of Union City, Pa. The road will run from Albright, Preston County, along Cheat River to Sandy Creek, and thence to Bruceton Mills, a distance of about 18 miles.

Track and Roadway

Municipal Railway of San Francisco, San Francisco, Cal.—The Public Utilities Committee of the Board of Supervisors of San Francisco has passed a motion requesting the city engineer to make a recommendation to the Board of Public Works as to the advisability of extending the Municipal Railway on Taraval Street from Thirty-third Avenue to the ocean.

Cincinnati (Ohio) Traction Company.—The Rapid Transit Commission of Cincinnati has received the following bids for the construction of the second section of the proposed rapid transit loop; The Hickory Brothers Construction Company, Columbus, Ohio, \$498,540; E. G. Yawger Company, Indianapolis, Ind., \$509,501, and Hinkle & Sullivan, Cincinnati, Ohio, \$563,935. The engineer's estimate was \$513,560. The section includes the portion of the loop between Charles and Oliver Streets, most of it underground construction, with a station building at Liberty Street.

Houston, Richmond & San Antonio Interurban Association, Houston, Tex.—Engineering work preparatory to the construction of the Houston-San Antonio Interurban Line, as planned by the Houston, Richmond & San Antonio Interurban Association, will begin shortly under the terms of a contract awarded at Houston to R. E. Gurley & Sons, Chicago. It is estimated that the engineering work will cover 186 miles and that it will cost \$186,000. The proposed line passes through Richmond, Rosenberg, Wharton, Gonzales, Sutherland Springs and San Antonio. H. A. Halverton of Houston is president of the company.

Seattle (Wash.) Municipal Street Railway.—The Seattle Municipal Street Railway system is to be improved by the re-routing of several important car lines, which will greatly reduce running time and cost of operation of these lines. New double tracks on Leary Avenue will shortly be completed, providing a short, direct route for the Fremont-Ballard car lines, and reducing running time eight

minutes each way. The double track on Avalon Way and 36th Avenue S. W. from Spokane Street to Alaska Street, will be completed soon. The company will double track its Division A line from 24th Avenue, N. W., to 28th Avenue, N. W.

Edmonton (Alta.) Municipal Street Railway.—The Alberta Utilities Commission will recommend to the Edmonton City Council the construction of extensions of the line of the Edmonton Municipal Street Railway along Brandon Avenue from the present terminus at Calder Street to a point not less than five blocks easterly. Construction is to be completed this fall.

Guelph (Ont.) Radial Railway.—Engineers from the Ontario Hydro-Electric Power Commission are going over the property of the Guelph Radial Railway and will report on the cost required to place it in good condition.

London & Port Stanley Railway, London, Ont.—The London Railway Commission will request the City Council to issue debentures to raise \$200,000 for improvements to the London & Port Stanley Railway. A by-law to this effect will be voted upon next January.

Toronto & Eastern Radial Railway, Toronto, Ont.—Pickering Township, Ont., the first of the nine municipalities interested in the construction of the Toronto & Eastern Radial Railway by the Ontario Hydro-Electric Commission, at a referendum election on Oct. 12 passed the necessary by-law in favor of the line by a large majority.

Power Houses, Shops and Buildings

Birmingham Railway, Light & Power Company, Birmingham, Ala.—The Birmingham Railway, Light & Power Company will erect a new substation equipped with one 1000-kw. rotary converter, together with switchboard, to supply 250-volt energy to Edison service. L. L. Newman is engineer in charge.

Rock Island Southern Railway, Rock Island, Ill.—Arrangements have been made whereby the Rock Island Southern Railway will secure power from the Keokuk, Ia., dam and will abandon its power house at Matherville, Ill.

Northern Ohio Traction & Light Company, Akron, Ohio.—Mayor Poorman of Canton, Ohio, has taken up the subject of a terminal station with the Northern Ohio Traction & Light Company. Such a terminal would relieve the traffic congestion in the Public Square.

Trade Notes

H. V. McKedy, assistant to the vice-president in charge of sales of the American Locomotive Company, has severed his connection with that company. He has been appointed Eastern representative of the Glidden Company, Cleveland, Ohio, with headquarters at 636 West Thirty-fourth Street, New York City.

Parsons-Moorehead Machinery Company, Hostetter Building, Pittsburgh, Pa., has been organized to do a general machinery business. William L. Moorehead was formerly vice-president of the Duquesne Electric & Manufacturing Company, while Mr. Parsons has been doing a general machinery business for several years.

Ohio Brass Company, Mansfield, Ohio, announces that Dr. Leonard F. Fuller has been made assistant manager of its insulator factory at Barberton, Ohio. During the war Dr. Fuller did some notable wireless work in connection with the laboratories of the Federal Telegraph Company at Palo Alto, California, for which he was honored by Leland Stanford University.

Atlantic Sales Company, Philadelphia, Pa., has been organized by M. F. Knapp and J. C. Vogel as manufacturers' agent with offices and warehouse at Fifty-ninth Street and Woodland Avenue. The new company will act as distributors for the Kentucky Electric Lamp Company; A. F. Daum Manufacturing Company's renewable fuses; Hart Manufacturing Company's mica insulation; and Arts Electrical Company's "Safety First."

New Advertising Literature

Macbeth-Evans Glass Company, Pittsburgh, Pa.: An illustrated folder on its Alba light No. 5350.

Pyroelectric Instrument Company, Trenton, N. J.: Bulletin No. 8 describing its quadrant electrometer.

St. Louis Electric Works, St. Louis, Mo.: Bulletin A on its type MU alternating-current battery charger.

Western Electro-Mechanical Company, Inc., Oakland, Cal.: A booklet describing its load and meter-testing equipment.

Caille Brothers Company, Detroit, Mich.: A booklet describing its electric ticket sellers and electric ticket choppers.

Rawson Electrical Instrument Company, Cambridge, Mass.: Bulletin No. 1 on its type 501 portable single-pivot meters.

Trumbull Electric Manufacturing Company, Plainville, Conn.: Bulletin No. 3, dated December, 1919, on "Safety" externally operated switches.

Belden Manufacturing Company, Chicago, Ill.: Bulletin No. 1214 on coil-winding machines has been issued in advance of its new catalog No. 8.

Conneaut (Ohio) Metal Works Company: Bulletin B on automatic valve-closed watertight electrical plug receptacles and attaching plugs.

Herman H. Stiche and Company, New York, N. Y.: Bulletin 105 AA, on its mono-pivot galvanometers, micro-ammeters, millivoltmeters and milliammeters.

Cutler-Hammer Manufacturing Company, Milwaukee, Wis.: Publication No. 479 covering electric heaters and entitled "Miscellaneous Applications of Electrical Heat."

Packard Electric Company, Warren, Ohio: Bulletin No. 200 describing its distribution transformers. Also Bulletin No. 202 on series regulating transformers for street lighting.

De Laval Separator Company, New York, N. Y.: A twenty-four page booklet on the De Laval method of purifying and reclaiming lubricating, cutting, hardening and fuel oils.

R. D. Nuttall Company, Pittsburgh, Pa.: Bulletin 25 on the heat treatment of steel gears for industrial mining and electric railway purposes. Also, Bulletin 26 on the application and use of helical type of gearing for electric railway service.



SAFETY ASSURED

With Birney Safety Cars Street Railway Companies can furnish transportation to its patrons with a greater certainty of SAFETY than any of its competitors.

THE REASON

Passengers cannot be thrown off the step by false starts because the car cannot start before the doors and step are closed. The possibility of collisions is reduced by their equipment with safety features which are brought into action quickly without any particular attention from the operator. Simply letting go the controller handle will do the trick.

The doors and step cannot be opened until the Car comes to a stop.



*Birney Safety Cars represent Improved Service—
Greater Convenience—
Increased Earning.*

THE J. G. BRILL COMPANY

Philadelphia, Pa.

AMERICAN CAR CO., St. Louis, Mo.
G. C. KUHLMAN CAR CO., Cleveland, Ohio.
WASON MANFG. CO., Springfield, Mass.



The Safety Car at Gary

TEN of these Safety cars equipped with GE-258 motors, K-63 control and CP-25 air compressor are in operation on the Broadway line in Gary.

Appreciation of the greatly improved service given by these Safety cars is being shown by a large increase in passengers carried



GENERAL ELECTRIC COMPANY

Published December 13, with Current News

ELECTRIC RAILWAY

JOURNAL

teen Cents Per Copy

Missing Nov 15, 22, 29

ROCKBESTOS

The Safety Car at Gary

TEN of these Safety cars equipped with GE-258 motors, K-63 control and CD-65 air



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GENERAL ELECTRIC COMPANY

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Published December 13, with Current News

ELECTRIC RAILWAY JOURNAL

McGraw-Hill Company, Inc. Nov. 15, 22, 29, Dec. 6, 13, 1919 Fifteen Cents Per Copy



Where heat-resisting qualities are required for armature and field coils RockBESTOS is the answer.

In addition to its fire-proof qualities it is also weather-proof, moisture-proof, oil-proof, alkali-proof and acid-proof.

The ROCKBESTOS insulation is as durable as the wire itself.

Write for—and analyze the sample of Rockbestos wire which we will gladly send on request.

**MARLIN-ROCKWELL
CORPORATION**

Insulated Wire Division
NEW HAVEN, CONN.

ROCKBESTOS

Two 60-Ton Baldwin-Westinghouse Electric Locomotives

For Through Freight Service on the Sacramento Northern

The successful and reliable operation of the Baldwin Westinghouse 50-Ton Locomotive installed over a year and a half ago by this road, was the strong recommendation which led to the recent selection and purchase of two new 60-ton high-speed Locomotives for the ninety-miles through-freight traffic between Sacramento and Oroville, California



The Baldwin Locomotive Works
Philadelphia, Pa.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

Baltimore and New York, Nov. 15, 22, 29, Dec. 6, 13, 1919

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Electric Railway Journal

H. W. BLAKE, Editor

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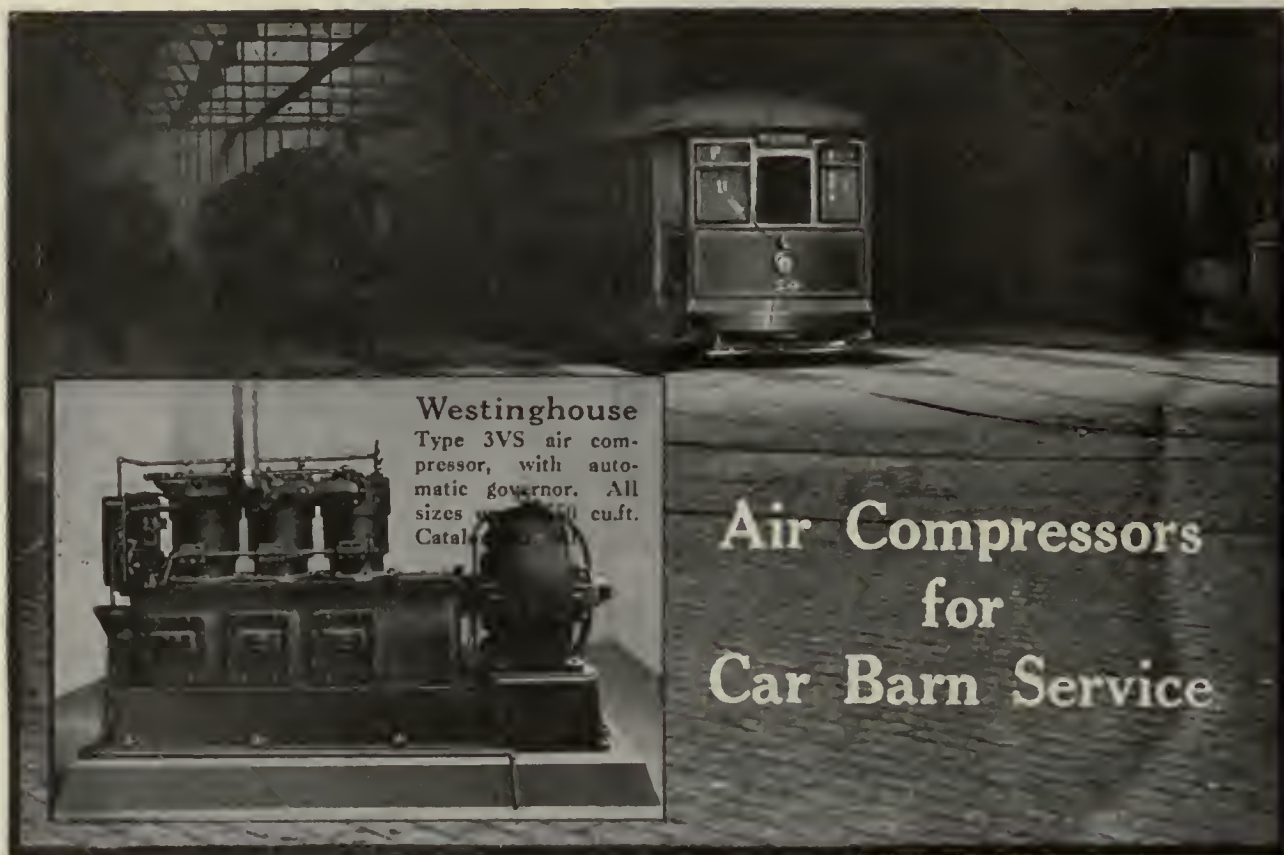
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Type 3VS air compressor, with automatic governor. All sizes. Catalogue.

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are perfectly suited to both air brake testing and use of pneumatic tools, etc.; also, the many other electrical railway uses in which air pressure is daily becoming a necessity.

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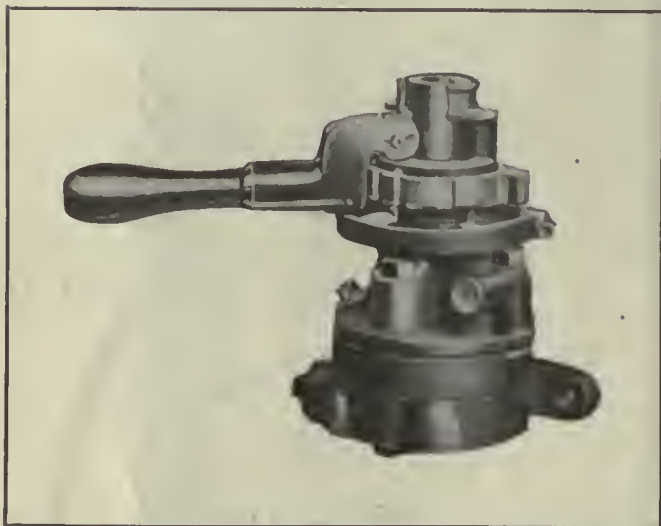
Says E. M. Walker, General Manager

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.

Well, we think that Mr. Walker ought to be a pretty good authority on that subject in view of his achievements at Terre Haute, Ind.

You wouldn't call a place where they don't average more than 21 cents a car-mile a cheerful prospect for good business, but Mr. Walker's experience with Safety Car operation in Terre Haute has shown that

*It's not the gross cents per car mile but
the net cents per car mile that count*



For instance, during the first six months of this year the bigger, old cars earned 21.95 cents per car mile but cost 19.84 cents per car mile, leaving the insufficient difference of 2.11 cents for taxes, fixed charges and the like.

Whereas during the same period, the company's Safety Cars earned only 20.62 cents per car mile, but as they cost but 11.25 cents per car mile to operate, the handsome difference of 9.37 cents was left for taxes, fixed charges, etc. So there you have it from the company's side.

BUT THE PUBLIC ALSO IS PLEASED

Because with the introduction of Safety Car service, 10-minute headways were shortened to 7 and 6 minutes, giving the public so great and so welcome an increase as well as a speeding-up of service that the traffic of the Safety Car lines jumped 43 per cent. That's why

**The Additional Safety Cars That Will Mark Terre Haute's
Leadership In Service Are Being Financed By Local Bankers!**

Terre Haute's Public-Pleasing and Money-Making Cars are Safety Cars because they are equipped with automatic, laborless apparatus, so interlocked that, regardless of the illness or distraction of the operator, the power will be cut off instantaneously, the air brakes and sander applied immediately thereafter, and the doors unlatched for safe and easy exit. Furthermore, it is a Safety Car only when the doors must be closed and the step folded before the car can start, and when the air brake must be applied before the doors are opened and the step lowered in bringing the car to a service stop.

SAFETY CAR DEVICES COMPANY

Main Office—Boatmen's Bank Building, ST. LOUIS

CHICAGO
Railway Exchange Building

NEW YORK
City Investment Building

PITTSBURGH
Westinghouse Building

CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.



Two Reasons Why More International Steel Twin Ties Are Being Laid Every Year

1. They save thirty to eighty per cent in cost of fastenings.

Eight solid malleable clips of the taper jaw type replace twelve (12) driven spikes in three (3) wood ties. The clips can be set in two minutes by one man with a two-pound hammer. No track gauge required.

2. They save thirty-three per cent. in handling of ties.

A STEEL TWIN TIE weighs the same as a wood tie, but there are one-third less Steel Ties to handle.

May we tell you all the other reasons?

The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

General Sales Office and Works: Cleveland, Ohio



PRODUCTS

Quality First



Imperial Type WDS, Pressed Steel, Gold Ray, Incandescent Headlight on Car

This property started out with 200 of these headlights and a year later came back for several hundred more of the same type.

ONE OF THE IMPERIALS WILL ANSWER YOUR HEADLIGHT QUESTION

Voltage conditions, speed, street lighting, local ordinances, maintenance facilities, class of service—these are some of the factors in headlight selection.

You can pick the headlight that fits your set of requirements from the Crouse-Hinds Imperial Arcs. There are various types of Incandescents, Carbon Arcs and Luminous Arcs.

We will be glad to offer suggestions if you will give us full details.

THE OHIO BRASS COMPANY MANSFIELD, OHIO

Exclusive Sales Agents in the U. S. for Crouse-Hinds Imperial Headlights.



PRODUCTS

Quality First



O-B Type A Trolley Ear

O-B AERA STANDARD EARS

Blueprint and metal formula for O-B Type A Ears check with the AERA Standard specifications for clinch trolley ears.

And the finished ears run uniformly true to blueprint and formula.

The groove is milled out. That means absolute accuracy of groove size and lip thickness—not to mention a snug, full length grip on the wire.

Metal is closely controlled by competent metallurgists. The routine test includes chemical analysis and microscopic examination of the bronze.

Every ear is inspected. Typical ears, selected at random from each lot, are tested to destruction for tensile strength and ductility.



This machine guarantees the accuracy of the groove and the lips



Metal formula is strictly followed

THE OHIO BRASS CO.
Mansfield, Ohio

NEW YORK PHILADELPHIA CHICAGO PITTSBURG LOS ANGELES SAN FRANCISCO

Phono-Electric

is not phased
by **REVERSE**
CURVES



This reverse curve at Arguello (First) Avenue and Sacramento Street, San Francisco, is wired in No. 00 round Phono-Electric Trolley Wire.

Curves are nasty places for trolley wire wear. Only a tough, durable, uniform wire should be used at such locations if long, unbroken, economical service is wanted.

That tough, durable and uniform wire for curves and other jobs is

PHONO-ELECTRIC

Bridgeport Brass Company
Bridgeport Connecticut

A Headlight is a good Headlight Only when it has a Good Reflector The "GOLDEN GLOW"



"GOLDEN GLOW" mirror reflectors are made of a special greenish-yellow glass and retain their initial high efficiency indefinitely. They are the only accurately ground and polished parabolic mirrors on the market which can be manufactured and sold at a commercial price.

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Manufacturer of Railway Material and Electrical Supplies

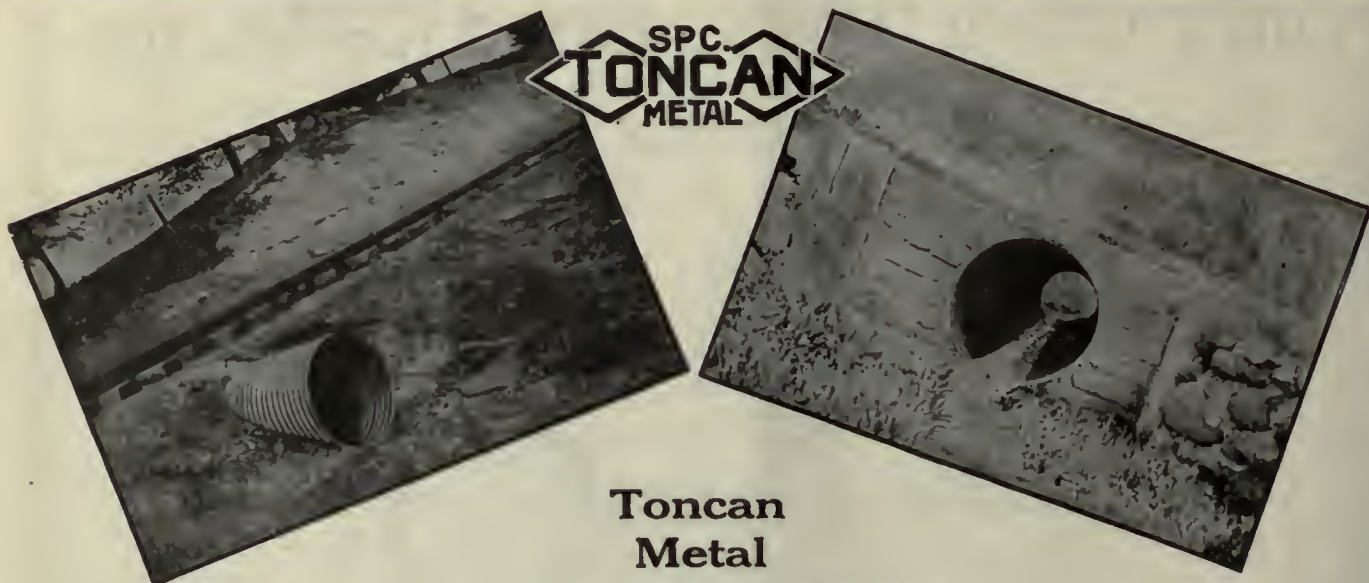
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Toncan Metal for Lasting Culverts



Toncan Metal Corrugated Culverts

—better than the ordinary kind

When you install a culvert you want to be sure that the one you put in will stand the wear and tear for years. Replacement costs are so high that the best culvert is the most economical.

Toncan Metal Corrugated Culverts do not break or crumble when subjected to temperature changes. They simply adjust themselves to meet conditions. They last for years because Toncan Metal is a super iron, which resists corrosion.

Shall we send our folder Q-68, which explains in detail why Toncan Metal Corrugated Culverts are the best for your use? A postal card will bring it.

THE STARK ROLLING MILL COMPANY

CANTON, OHIO



SEMAPHORE

PROCEED



STOP



CAUTION



PROCEED



FOR DOUBLE TRACK *Interurban Railways*

Union automatic
 □ block signals □

afford a simple system of indications easily understood by trainmen.

The continuous A. C. track circuit makes possible the use of "polarized" or "wireless" control and insures the display of the proper indication at all times.

LIGHT

PROCEED



STOP



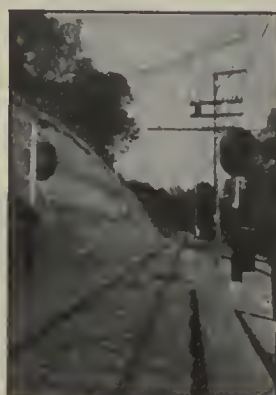
CAUTION



PROCEED



On the New York State Railways



On the Oakland, Antioch and Eastern

UNION EQUIPMENT WILL SOLVE YOUR INTERURBAN
TRAFFIC PROBLEMS

Let us study your operating conditions and cooperate with you in considering what *automatic block signaling* will do for *your line*.



Union Switch & Signal Co.

SWISSVALE, PA.



Attention

STREET RAILWAY MANAGERS

TO PROTECT CROSSINGS OF STEAM ROADS AND

ELECTRICALLY OPERATED DERAIL

IS NECESSARY. THIS IS OF GREAT IMPORTANCE WITH

ONE MAN CARS

ANOTHER NECESSITY IN THE SUCCESSFUL
OPERATION OF *One Man Cars* IS THE

"CHEATHAM SWITCH"

STANDARD THROUGHOUT THE WORLD

WRITE

CHEATHAM ELECTRIC SWITCHING DEVICE CO.
INCORPORATED

LOUISVILLE, KY.



Keokuk, Iowa

Like Keokuk Your City Can Have a "White Way"

NOTE, if you please, the handsome, dignified appearance in daytime of the "Elreco" Combination Railway and Lighting Poles which have given the city of Keokuk its "white way," and the railway company permanent, tubular steel construction trolley wire support poles—to say nothing of clearing the street of a multitude of disreputable looking wooden poles and ancient lighting fixtures!

And it was accomplished in a very simple manner. The street railway company and the city authorities agreed to share the expense, since both would share the benefits. Our No. 10154

lighting brackets were attached to "Elreco" Tubular Poles set to support the trolley span wires—and at a minimum of both initial and maintenance cost to each the desired effects were obtained.

Today Keokuk has a "white way" that brings business to both the merchants and the railway company. You can start a similar scheme in your own city, with the full knowledge that the merchants of the community will back you up solidly.

Write for Catalog "F" showing reproductions from actual photographs of "Elreco" Combination Railway and Lighting Poles installed in many cities.

ELECTRIC RAILWAY EQUIPMENT CO.

CINCINNATI, OHIO

New York: 30 Church Street

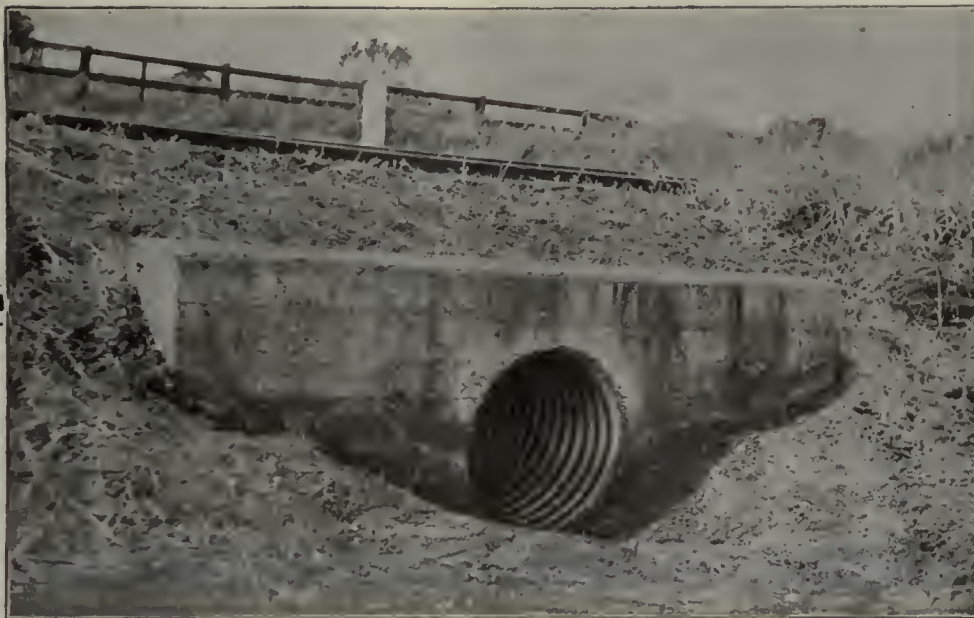


A Clear Track for Following Traffic when materials are dumped by the Differential Electric Dumping Car

In freight service, this train of three cars would earn you more than \$300 per day. Have you a single passenger car that earns \$100 per day? *NO. Then go after freight business.*

Send for details of the 1920 model cars
DIFFERENTIAL CAR COMPANY, INC.
General Offices: 141 Broadway, New York City

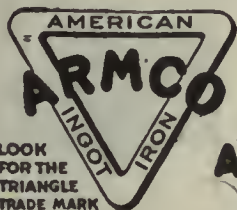




A Test That Covered 10 Years

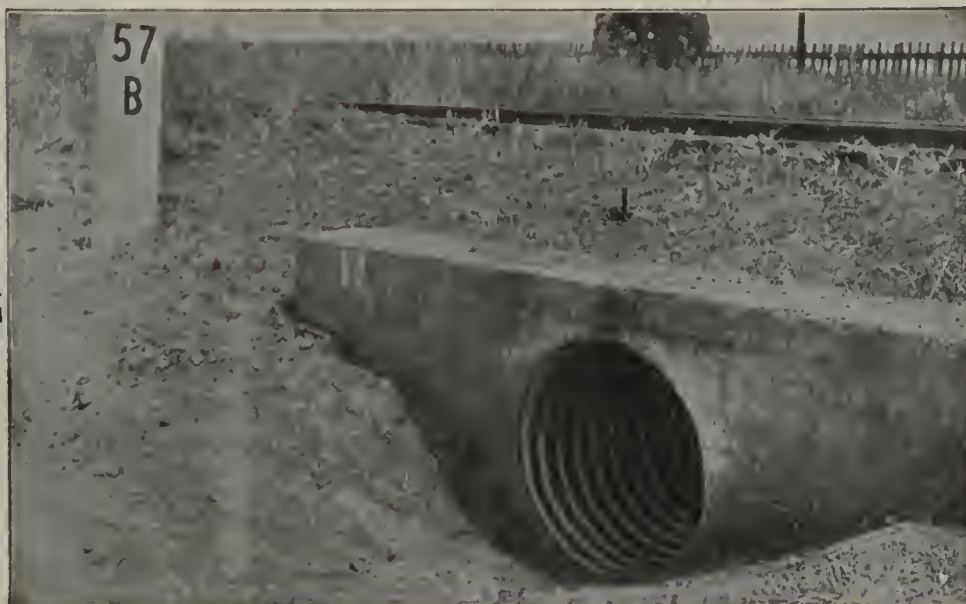
These Armco Iron Culverts were installed 10 years ago on the main line of one of the country's great railroads. For 10 years heavy traffic has rolled over these rails, only a few feet above the culverts, but today they are as staunch and sturdy as on the day they were installed.

Armco Iron Culverts are the culverts for the permanent roads.



There is a manufacturer in nearly every state and in Canada, making genuine rust-resisting ARMCO IRON CULVERTS and other products of ARMCO IRON such as flumes, siphons, tanks, road signs, roofing, etc. Write for full information and nearest shipping point on products in which you are interested.

ARMCO IRON CULVERT & FLUME MFRS. ASSN.
TRANSPORTATION BLDG. CHICAGO



A World of Culvert Business

In Russia where they wear fur coats,—in the Orient where the sun is unmercifully hot,—in South America where the rainfall is excessive,—in fact, in most any country in the world you'll find

ACME (NESTABLE)
Anti-Corrosive Corrugated
CULVERTS
Galvanized

They are universally popular because they are so easy to ship, haul and install. "ACMES" come knocked down, nested into bundles of convenient size for handling. They can be hauled in an ordinary farm wagon.

Two men, with ordinary wrenches, can set up several hundred feet of "ACMES" in a day. You can't go wrong because the holes are already drilled in the flange—you merely place one section on top of another and bolt them together.

If desired, we ship "ACMES" already set up.

Write for Folder M-21

THE CANTON CULVERT & SILO CO.
MANUFACTURERS
CANTON, OHIO, U.S.A.

OPENED BY

Radicalism Routed



UNREASONABLE demands of labor have, as our readers know, made it necessary to print the Electric Railway Journal, in common with the other McGraw-Hill publications, outside of New York.

Many of our compositors and pressmen have now accepted the terms offered to them before the strike. They are at work in our own printing plant. The radicals are still out and will be kept out.

The strike has collapsed.

It will, however, be some time before the congestion of work in our own printing plant is relieved. In the meantime, the Journal will have to be printed in Baltimore and elsewhere.

Even with splendid co-operation on the part of other printers, this is a serious handicap. Nevertheless, every issue will measure fully up to the high standard which Electric Railway Journal readers have learned to expect. Every issue will report the news of the industry up to the minute that the last text pages must go to press. Every issue will be a step forward.

The task of maintaining Electric Railway Journal service in the face of grave difficulties has been immeasurably lightened by the loyal letters of approval which have poured in from the field.

A few of the many expressions of good will that have been received are printed on the next page. They emphasize the need for this paper, its opportunities for service and its responsibilities.

The principles of justice and reason for which the publishers have fought have triumphed.

Service to the electric railway industry in its hour of need will be maintained.

Electric Railway Journal

Extracts from some of the letters received by us after the strike began

From the president of a large railway in an Eastern State:

“I AM sure the street railway fraternity will be glad to be patient with you and to wish you the greatest success in holding out against unreasonable demands. We have all been up against this question from time to time and have wished that we were in a position to do just as you are able to do—that is, move to another city or absolutely close up shop until such time as those to whom you have given a livelihood are willing to meet you on a reasonable basis.”

From the vice-president and general manager of a railway in Pennsylvania:

“WE congratulate you on your stand as outlined in your bulletin of October 4. You have assumed the proper course, and while we regret not receiving the publication, we are willing to do without it as long as, in your judgment, it is necessary to maintain the integrity of your position.”

From the president of an extensive city and interurban railway in the Central States:

“I WANT to express to you my congratulations on the stand that you are taking in fighting the demands of the printers out to a finish. You will unquestionably find that practically all of your subscribers will be only too glad to suffer any temporary inconvenience that may be necessary for the sake of having this fight carried through to a satisfactory conclusion.”

From an electric railway official in the Southwest:

“SO far as this organization is concerned, your stand on this printing strike is unanimously indorsed, and we are willing to suffer with you the inconveniences of the bulletin service as is needful in beating this strike.”

From the vice-president and general manager of an important insurance company in New York:

“I WANT to assure you personally of our sympathy with you in the present printers' strike. I believe that the action taken by the printers is unwarranted, and, as far as we are concerned, we are more than glad to waive the pleasure of receiving *ELECTRIC RAILWAY JOURNAL* in order to contribute to what we consider opposition to unjust demands.

“I hope that you, and other technical journals affected by this strike will appreciate that the entire sentiment of the public is with you, and that the matter will be threshed out to a final and complete satisfactory adjustment.”



Where utmost accuracy is essential

Little Giant Precision Grinder with external arbor. This grinder is readily convertible from one type to the other, for internal or external grinding.



FOR precise internal or external grinding where accuracy is no less an object than speedy, economical operation, Little Giant Electric Precision Grinders are everywhere justifying their choice by exacting users and have established the value of the unique features which they possess.

The internal arbor is mounted on substantial ball bearings of ample size to insure long life and great accuracy. The external arbor is mounted on split sleeve bearings provided with adjustment to take up the wear. The bracket which carries the motor and the arbor is machined on the lower side to the arc of a circle and rests on a concave washer. This arrangement permits raising and lowering the center of the grinding arbor to adapt the tool to various sizes of lathes.

Little Giant construction permits the emery wheel to be worn down to small diameter, and provides ample clearance for the grinder back of the tail stock of a lathe. These and other features have lead to standardization on Little Giant Precision Grinders by big shops in many industries. Write for bulletins.

Chicago Pneumatic Tool Company, 1062 Fisher Building, Chicago

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CHICAGO PNEUMATIC AIR COMPRESSORS... VACUUM PUMPS... GIANT FUEL OIL, GAS,
GASOLINE AND STEAM ENGINES... ROCK DRILLS... COAL DRILLS

LITTLE
Electric



GIANT
Tools

Lackawanna

Safety-head Angle Bars

prevent the sharp undercorners of rail heads from breaking or weakening the bars and the joints

Plain angle bar rail splice which fractured in service under back action from the wheel load. The wear which weakened the skin surface of these bars and aided in their fracture is plainly indicated. The safety depression of the Lackawanna Safety-head Angle Bar prevents this wear.



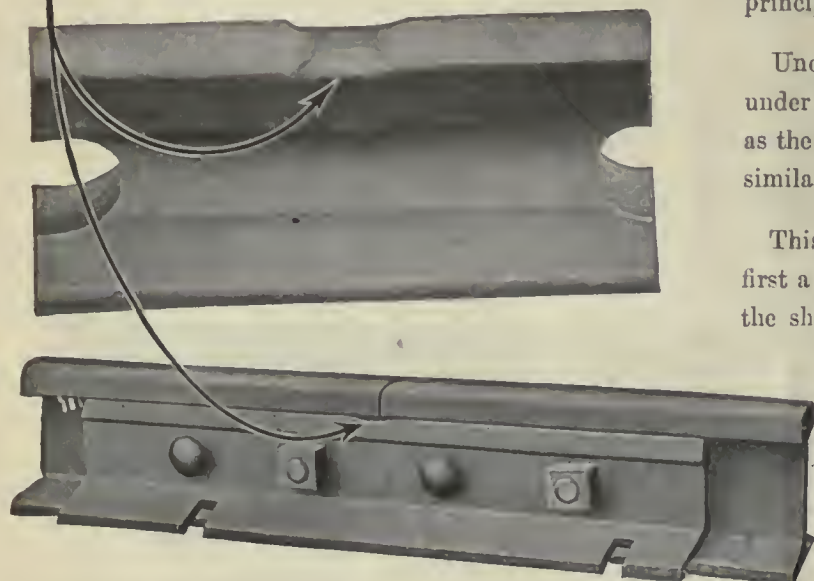
Breakage of angle bars in service results not always from inferior strength of metal but often from punishment of the bar that would be avoided with proper bar design.

It is well known that a bar or beam with its original skin metal unbroken will safely withstand heavier transverse stresses and consequently heavier loading than where the edge or flange is abraded. If the nick or abrasions in the metal surface are near the center of the

beam and come under tension, the breakage will always develop at the nicked or abraded spot. An angle bar or splice bar on a rail joint is a peculiar illustration of this principle.

Under passing trains the rails are flexed downward under the rolling wheels, and then lifted or bent upward as the load passes the joint, the undulating motion being similar to that with a load travelling over thin ice.

This undulation or wave motion of the rails causes first a wearing or cutting of the angle bar at the top by the sharp undercorners of the rail heads. Then when



Lackawanna Safety-head Angle Bar and detail of the improved safety-head depression which prevents surface wear and cutting underneath the end of the rail head.

the upward thrust occurs as the wheel load passes, the head of the angle bar is brought into tension and a nicked or worn bar quickly develops into a broken joint with its consequent disaster. The prevention of this wear or notching of the angle bar at the center will eliminate the initial cause of broken bars.

That is exactly what is accomplished in the Lackawanna Safety-head Angle Bar. By depressing the metal slightly in the head of the bar at the center contact with the sharp undercorners of the rail heads is prevented. This depression is put into the bar while hot and therefore the original skin metal is preserved. The metal in the angle bar retains its tough rolled surface without wearing or upsetting under the action of the wheels at the joint. The bars are much better able to resist the upward flexure under passing loads.

The Lackawanna Safety-head Angle Bar therefore affords the following very definite advantages:

1. The "Safety-head" prevents cracking and weakening of the bar and the pounding of the joints out of surface.
2. The "Safety-head" prevents breaking of the bars and the danger which results therefrom, particularly on curves, where rending of the bars may so weaken the resistance of the rails against lateral thrust from wheel flanges that the ends of the rails may "lip" at the joint and cause derailment.

Let us figure with you on a trial installation on some stretch of track where these Safety-head Angle Bars would be given a severe test.

The Lackawanna Safety-head Angle Bar is your own section made break-proof

Other Lackawanna Aids to Better Track

The Lackawanna Descaming Process, to which all our rails are subjected, leaves the rail head and base free from the cracks and weak, streaky, laminated, partially decarburized metal that under the ordinary manufacturing processes is an inherent cause of undue surface wear and rail fracture.

The Lackawanna Hook-Shoulder Tie Plate



One or two plain spikes on the plain rib complete the bond between plate and both rail flanges. The plate is fastened to the tie by independent plain or screw spikes. The rail may be removed without disturbing the plate.

Is simple, strong, durable, convenient for installation, and by holding the rail with great security prevents undue wear and destruction of material, saves repair costs and reduces maintenance labor.

Two ribs on top form a channel in which the rail base rests. One of the ribs is plain and the other hooked to make a holder.



Lackawanna Track Bolts and Spikes

Our track bolts and spikes of all standard sizes for light or heavy rails, enjoy an enviable reputation for careful, accurate workmanship and finish.

The Abbott Rail-Joint Plate



"BUILT LIKE A BRIDGE"

protects the rail ends from battering and breaking down.

The hard steel and combination of reversed flanging within the plate provides for internal stresses and imposes the load on the two joint ties with about the same action as between a short deck bridge and its piers. Upturned corner lugs engaging the ends of the angle bars act as anti-creepers and as rail guards to prevent misalignment if the angle bars break or become loose.

Abbott Plates are equally applicable to and advantageous on new or relaid track and will extend the life even of old track for several years.

These plates are made in types especially suitable for ordinary steam railway service for use in paved streets and for welding to the rail base and may be held with either screw or ordinary spikes.

Write for our booklets, "Lackawanna Descamed Rails," "Lackawanna Improved Track Appliances," and "Lackawanna Track Bolts and Spikes."

Lackawanna Steel Company

General Sales Office and Works: Lackawanna, N. Y.

Atlanta Boston Buffalo Chicago Cincinnati Cleveland Detroit New York Philadelphia St. Louis San Francisco

Sole Exporter of Our Commercial Products: Consolidated Steel Corporation, 105 Broadway, New York

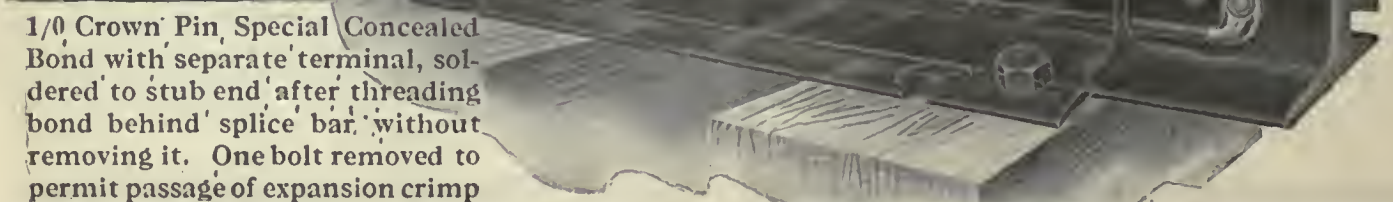
CROWN Rail Bonds

Made by

American Steel & Wire Company

Chicago
New York
Cleveland
Pittsburgh
Denver
U. S. Steel Products Co.

Entrance to Coaldale Tunnel—Norfolk and Western Railway—
Elkhorn Grade Electrification



1/0 Crown Pin, Special Concealed Bond with separate terminal, soldered to stub end after threading bond behind splice bar, without removing it. One bolt removed to permit passage of expansion crimp

Good Power Saving Rules

1. Do not feed too slowly. Fifty per cent of the energy drawn from the line during the notching-up process is wasted in heat in the resistance grids.
2. Do not feed too rapidly—that is, to the point of spinning the wheels. This wastes power, injures the equipment and is uncomfortable for the passengers.
3. Do not try to coast up-grade between stops. This calls for reacceleration and consequent resistance losses.
4. Avoid unnecessary slow-downs which can be foreseen.
5. Do not use the brakes and power simultaneously.
6. Do not “fan” the brakes.

ECONOMY ELECTRIC RAILWAY METER

Meters Car Energy



The ECONOMY Railway Meter is the only rating device which actually and directly measures a man's relative efficiency under all conditions. Likewise, the meter method does not encourage operating practices that may be contrary to “safety first” rules.

With an ECONOMY Railway Meter installation the men are taught to save power, and their performance is measured in units of what they are asked to save. They write their own “power bills.”

The ECONOMY Railway Meter actually measures what the motorman is trying to save—Power. He sees his own record at any time—just like a mileage recorder on an automobile. He is rated by a direct unit—not by a derivative. He can check himself progressively if he wishes—and the good men do that.

The meter method encourages interest in power savings because the motorman at any time may check the instructor's power-saving teachings and satisfy himself as to the most economical methods of operation.

Simplest and Most Informative

The records for the ECONOMY Railway Meter method require little effort on the part of the motorman. He sets down his “time and place on” and “time and place off,” and his “meter reading on” and “meter reading off” for each car operated. These daily records are summarized in the office.

The ECONOMY Railway Meter system is

the simplest and most informative for the crews and the office. The records from the ECONOMY meter department produce accurately the mileage of all cars and relieve the present mileage department of this work, which alone is costing many roads as much as will be the entire clerical cost for keeping the combined power and mileage data with the ECONOMY meter.

Write for new Power Saving Booklet

ECONOMY ELECTRIC DEVICES COMPANY

General Sales Agent

SANGAMO ECONOMY RAILWAY METER

Old Colony Bldg., Chicago

National Railway Appliances Co., New York

L. A. Nott, San Francisco

Burton R. Stare Co., Seattle

J. G. Monahan, Los Angeles

Ludwig Hommel & Co., Pittsburgh

Winter Weather Demands The Quick, Air-Operated Door

Now that the non-bulkhead car has become standard, it is more than ever essential that the vestibule doors should be capable of opening and closing at any pre-determined rates of speed.

At no season of the year is such speed more important than in winter when delayed operation of doors means discomfort to the passengers as well as reduced schedule speed to the railway.

National Pneumatic Door and Step Control With Safety Interlocking Features Will

Please your passengers by getting them home faster.

Promote the comfort of your passengers by conserving heat.

Reduce accidents by avoiding premature use of slippery steps.

Please your platform employees by relieving them of manual effort.

Please yourself by preventing the waste of heat and securing more car miles per hour.

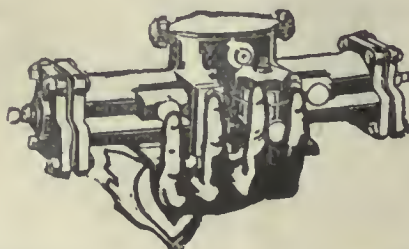
Whether you are installing National Pneumatic Door Engines alone or as a part of the famous Safety Combination of the Safety Car Devices Company, we urge that you also use the door shaft and step shaft devices of the National Pneumatic Company to secure the smoothest and most reliable operation possible with National Pneumatic Door Engines.

NATIONAL PNEUMATIC COMPANY

Works, Rahway, N. J.

50 Church St., New York

Edison Bldg., Chicago





"He can check it with his own watch"

First—Because it talks the language of the motorman. It measures the power-on time—and (note this for it is important) it measures it in terms that the motorman understands—minutes. If you want to save power, encourage the motorman to shut it off by recording the minutes he has the power on.

Second—It encourages legitimate coasting without holding off the brakes until the last second each time.

It encourages the motorman to run with the power shut off—the natural way to save power and also the safest method of operation.

Third—The motorman has faith in the Arthur Recorder for the reason that he understands it easily. If necessary he can check it up with his own watch at any time. Because of this his cooperation is more easily obtained and better power-saving results are produced than where the motorman is more or less working in the dark.

Fourth—It requires but little clerical work to follow up the records.

Fifth—Where desired its figures can be used as a basis for arriving at car inspection intervals, so doing away with the cost of obtaining individual car mileages.

**The Arthur
Power-Saving Recorder Co.**
New Haven, Conn.

7 Reasons

why you should choose

Arthur Power-Saving Recorders

Cars can be inspected on a "service" rather than on a mileage or daily basis.

Sixth—Since it costs comparatively little and saves a great deal, it follows that it will pay for itself on any property in a very short time.

Seventh—You don't have to buy Arthur Recorders. If desired we rent them on easy terms and allow the full amount of the rental payments to apply on the purchase price.

The advantages of Arthur Recorders are substantiated by the solidest kind of facts, by hard cash saved on large scale properties.



"It Talks the Language of the Motorman."

Two Courses to Follow

**Grind Your Old
Track at a Low
Expense or**



**Build New Track
at a Large Expense**

No doubt most of you have come to the point where some of your track is in very bad condition and maybe some of you think you will have to lay new rails.

However before you get that far why not get in touch with us and let us show you how big a mistake you will make if you lay new track. This same old track can be ground and the surface put into good condition at probably 1/20 the expense of laying new track.

It will pay you to investigate. Do it now for tomorrow never comes.

RAILWAY TRACK-WORK COMPANY

30th and Walnut Streets, Philadelphia

A Collective Indorsement



The Superintendent
of Equipment Appreciates—



The President
Indorses—



The Dweller Near the
Right-of-Way Demands—



The Shop Foreman
Knows—



The Motorman Feels



The Passenger Enjoys—



The Davis Steel Wheel has the indorsement of the electric railway field from the President of road to the Passenger who rides in the cars, and even the dweller near the right-of-way.

Davis equipped cars are kept on the job and are therefore continuous revenue producers.

The hard manganese tread of the Davis Steel Wheel is responsible for the scarcity of slid-flats and for its famous one-wear qualities.

American Steel Foundries
1100 McCormick Bldg.
Chicago



Making Track as Permanent as the Paving



Lesson No. 10:

The Resiliency of Dayton Mechanical Ties Absorbs the Shock of Travel Perfectly

The asphalt cushion is the most notable single feature of Dayton Mechanical Ties. It forms a rubber-like buffer which serves to absorb the vibrations set up by constantly passing cars, and it provides ample expansion facilities to protect track from distortion due to severe temperatures.

Ordinary wood ties have some resiliency, but the Dayton Mechanical Tie combines the resiliency of *wood and*

asphalt, with the result that none of the shock and jar of passing travel is transmitted to the concrete in which the tie is embedded—the pounding which would otherwise pulverize the concrete surrounding the tie is completely absorbed.

And, the resiliency of Dayton Mechanical Ties means increased comfort to passengers, less noise, and longer service from rolling stock.

We will gladly supply full information on request.



THE DAYTON MECHANICAL TIE CO.

704 Commercial Bldg.
DAYTON, OHIO



50 Years of Galena Experience

Some one has well said that "to some men experience is a ladder by which they climb to new achievements, while to others it is a rut from which they never get out."

Every year of the half century of experience that lies behind

GALENA OILS *and* GALENA SERVICE

has been a year of progress in better lubrication methods. There is a big difference between the experience that is 50 years *old* and the experience that is 50 years *young*.

There are just as many difficult problems in lubrication methods today as there were 50 years ago.

Galena Service brings to their solution the same fresh vision that has been typical of Galena methods always.

After 50 years we are still willing to grow.

It is that spirit *coupled* with experience that makes Galena Service so valuable to the electric railway industry.

Galena-Signal Oil Company Franklin, Pa.

Works at Franklin, Pa. Parkersburg, W. Va. Whiting, Ind.
Bayway, N. J. Toronto, Can. Rouen, France.

Offices in all Principal Cities of U. S.

LONDON

PARIS

BUENOS AIRES



Rome-Wire

ROME-WIRE

Keep Your Emergency Wagon Supplied With Rome-Wire

THE annual replacement of some of your trolley wire is a necessary part of your system maintenance and this expense can be materially reduced by installing ROME trolley wires—we make them round, grooved or figure 8.

ROME trolley wires and feeder cables mean higher efficiencies, lower maintenance and general satisfaction from the G. M. to the men on the emergency wagon—by using them you get real ROME Service and at the same time, save money.

We're ready to prove it to you.



**Rome
Wire Company**

Rome, N. Y.

All Operations from Wire Bar to Finished Product in this Plant.

Rome-Wire



TAKE YOUR PLACE IN THE SUN

Don't stay any longer in the gloomy shadows cast by the high cost of coal. Use the

Rico Coasting Recorder

which has proved on thousands of cars in city, suburban, interurban, subway, elevated and electrified steam service everywhere that it

OFFERS THE SIMPLEST AVAILABLE METHOD OF ESTABLISHING IMMEDIATE, SUBSTANTIAL AND PERMANENT ECONOMIES.

*Can Be Obtained on Rental or Installment Basis
That Demand No Additions to Capital Account*



Time is the Essence of Railroading

RAILWAY IMPROVEMENT CO.



61 BROADWAY, NEW YORK



FACTORY FOR JOHN B. SEMPLE & COMPANY, STOOPS FERRY, PA.

GETTING *THE* CONTRACTOR IS MORE IMPORTANT THAN GETTING *A* CONTRACT!

Your plant extension must comprehend something more than the mere letting of a contract if it is to add to the efficiency of your operations as well as to their scope.

If you will let us confer with you on the matter, it is almost certain that we can evolve from an analysis of *your problems* and *our experience*, suggestions which you will find it beneficial to adopt.

All that we ask is a conference.

The contract will take care of itself.

Our Advice is as Good as Our Service

THOMPSON-STARRETT COMPANY
INDUSTRIAL CONSTRUCTION

NEW YORK

CHICAGO

DETROIT

PITTSBURGH



The headlights are always bright on the 200 GECO equipped cars

Over 200 GECO Resistor equipments are now in operation on interurban cars. Such ready acceptance of this new device for automatically maintaining even voltage for incandescient headlights is proof positive of its efficiency.

The long life of GECO Resistor Units has established a new low figure for headlight maintenance.

A partial list of companies operating GECO equipped cars includes the

Northwestern Pacific R. R. Co.,
San Francisco-Oakland Terminal Rwy.,
Sacramento-Northern R. R.,
Central California Traction Co.,
Tide Water-Southern Railway Co.,
Peninsula Railway Co.,
Petaluma & Santa Rosa R. R. Co.

These users have found GECO Resistors permit maximum speed with a high degree of safety. Write the above companies for proof and write us for details.

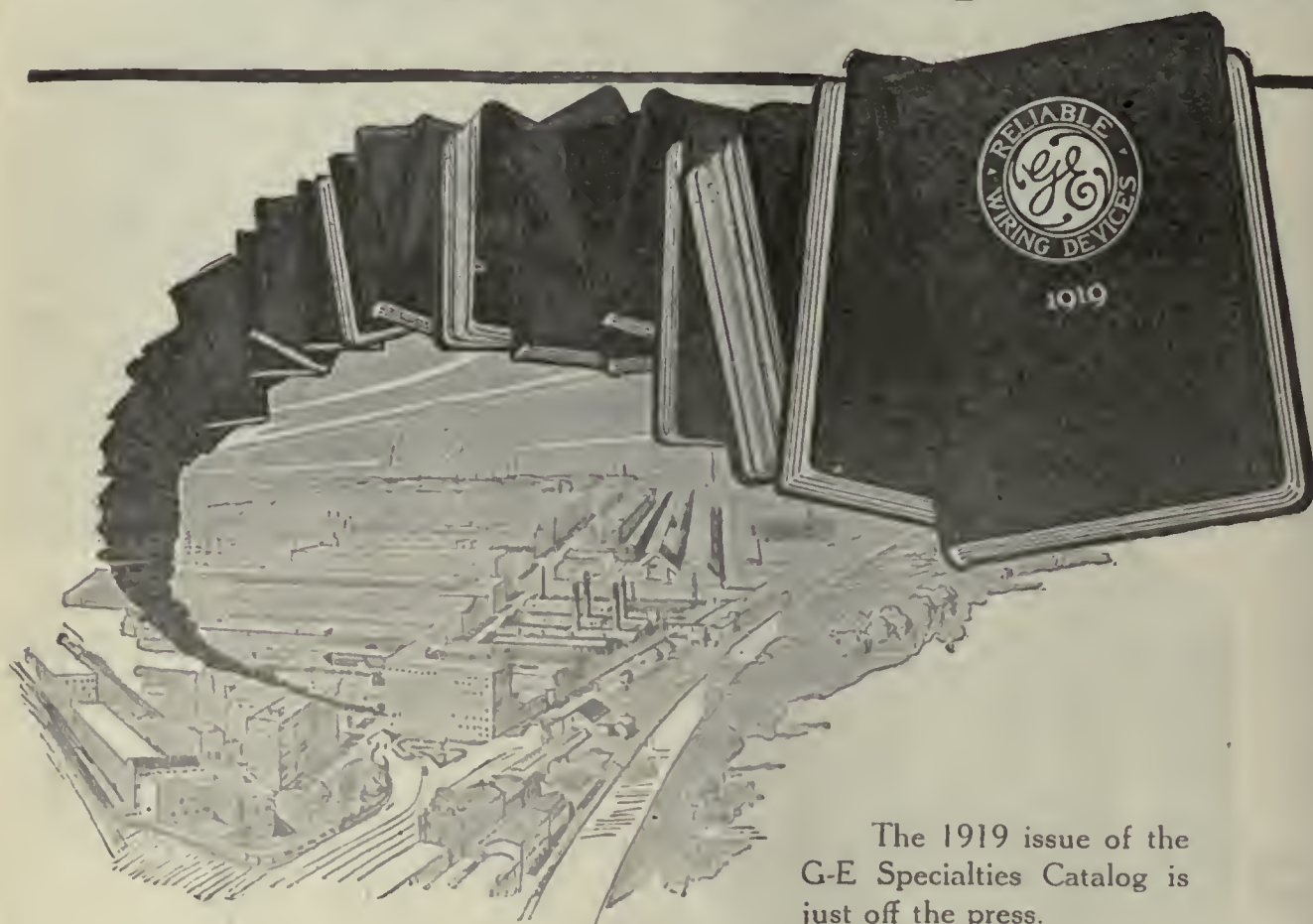


GECO Resistor

No moving parts
No contacts or solenoids
Occupies small space in motor-man's vestibule.
Is easily installed.
Low first cost and maintenance.

General Electric Company
General Office Schenectady, N.Y.

A New Pocket Catalog of G-E Wiring Devices



The 1919 issue of the
G-E Specialties Catalog is
just off the press.

It is the most complete catalog of G-E wiring devices ever published, including many new devices added to the G-E line since the last issue. Its convenient pocket size (measuring $3\frac{1}{4}'' \times 4\frac{5}{8}'' \times \frac{1}{2}''$) recommends it for handy use by architects, contractors, dealers, jobbers and electricians of electric railways and industrial plants. Ask us for a copy.

G-E RELIABLE WIRING DEVICES
can be furnished by any
reputable electrical contractor

General Electric
General Office  **Company** Schenectady, N.Y.

Published on December 13 with Current News

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Vol. 54

Baltimore and New York, Nov. 15, 22, 29, Dec. 6, 13, 1919

No. 20

The Strike Is Over and Radicalism Has Been Routed

WHEN the radical leaders among the New York printers brought on the strike on Oct. 1, they hoped to tie up the printing situation in New York so that no issues could be printed. The ELECTRIC RAILWAY JOURNAL felt that it could not give in to the unreasonable demands of the strikers so commenced printing in another city.

This is the seventh issue of the ELECTRIC RAILWAY JOURNAL which has been published away from New York. The editorial and mechanical problems of using a printing office some 200 miles away from the main editorial office are not small. We have had to divide our staff, keeping part in one city and part in another. We have also had to use printing facilities not primarily designed for the publication of periodicals. But we have received hearty co-operation from the printing fraternity in the city where we have been doing our work, and without them the undertaking would have been impossible. We have endeavored to maintain throughout these issues published outside of New York the same editorial standards as when work was done in our own office.

We are glad to report that the compositors and pressmen in New York now see the futility of remaining out of work longer. Many of our old men have accepted the terms which had been offered to them before the strike, and they are again at work in our own printing plant. In other words, the strike has collapsed, and radicalism in the industry has been routed.

We are deeply appreciative of the support which our subscribers have extended to us during this fight. Their letters of encouragement and the absence of any complaint about the delayed service have been a great help. Our advertisers have been equally generous with us and have authorized us to repeat their copy as often as was deemed to be expedient, instead of making the usual changes in wording or subject matter.

As our printing office will be congested for some time to come we have a choice between two courses. One is to publish our delayed issues as rapidly as we can, say every five days, until we are even with the calendar. The other is to combine the editorial sections for the next five successive issues so that we can be back on our regular schedule at the earliest possible date. The latter plan, of course, is much more expensive as by it we omit the equivalent of four complete issues of advertising. Nevertheless, we have decided on this course as it will more quickly bring the reader up to date, and we consider it a duty to do this and

also to pay the cost of the strike ourselves and not pass it along to the advertiser.

This number, therefore, carries five dates and represents the issues which would normally have been issued on the Saturdays from Nov. 15 to Dec. 13 inclusive. Beginning with the issue of Dec. 20, this paper will be published from New York and will be back on its regular schedule.

January Eight a Busy Day for Railway Executives

THE program for the mid-winter conference of the American Electric Railway Association, to be held in Cleveland on Thursday, Jan. 8, 1920, is beautiful in its simplicity, but the topics to be discussed furnish a wide scope for the expression of thought. Take, for example, the matter of increasing the membership dues in the association. The income must be increased—that point will require no discussion—but how much? The demands on the organization are increasing at a rate which is both alarming and encouraging; alarming because it is causing the small surplus of funds to be rapidly consumed; encouraging because it shows that the association is needed and appreciated. The augmented demand for service comes at a time when the cost of giving it is multiplied by the well-known H. C. L. factor.

For many members, however, the cost of membership has in the past been merely nominal; often a single item of association service has been worth a whole year's fee. In view of these circumstances all members will welcome a statement from the special committee which has been working on the matter, giving expert opinion as to how much income is needed, how much the industry can reasonably be expected to contribute, and how it is proposed to divide the expense among the members in accordance with ability to pay.

The revision of dues is down on the program for settlement first. With this question settled right the conference will be in a mood to consider the technicalities of depreciation and the labor situation.

Cleveland is a very happy choice for the conference this year. Recent conferences have been held on the Atlantic Coast for good and sufficient reasons, but it is only fair to the Western members to make the meeting more accessible to them at this time. There is a certain spirit of hospitality and general friendliness in the Middle West, also, that renders a visit there very attractive at any time. The opportunity to study railway operating conditions in the home

of service-at-cost, of the erstwhile 3-cent fare and of Peter Witt's (formerly) 1-cent car line will also be appreciated by the delegates.

In How Large Sizes Can

Turbo-Generator Units Be Built?

A VERY instructive presentation of the elements of a modern steam-turbine design was made at the American Institute of Electrical Engineers meeting held in New York City on Nov. 14. The chairman of the meeting explained that the program was planned long ago, before the occurrence of the epidemic of turbine troubles which accompanied the war period. The information given in the papers and the opinion expressed therein and in the subsequent discussion will, therefore, prove doubly reassuring to those who may have feared that limitations in regard to safe size in turbines, and to safe capacity for a given weight, have already been passed. The fact is that the causes of trouble have now been diagnosed and the remedies appear to be simple and easy of application. Compared with the number of machines operating smoothly and continuously for long periods the number of those which have given trouble is small, but the trouble has had wide publicity owing to the popular and technical interest in the steam turbine.

We must remember that the steam turbine and its running mate, the high-speed, high-capacity generator, have imposed new and difficult problems on designers. Here is a combination of high-pressure, high-temperature steam, flowing with tremendous velocity through a very novel bucket-wheel structure, a structure which by the very nature of the principles involved is much more difficult to render mechanically stable than the older types of engine. Moreover, the steam turbine is still young, but owing to its inherent virtues the demand for it in larger and larger sizes has been so insistent that the manufacturers have been kept "on their toes" to supply the demand. This has made difficult the maintenance of the close relation between the science and the art of turbine construction which would have insured even greater efficiency and reliability.

The net result of the very rapid development of the turbine, however, has been that at present the units can be built in any size that is demanded by economic considerations. The turbine is being built in large sizes at an efficiency closely approximating theoretical perfection (that is, within 25 per cent). In other words, the turbine is extracting from the steam almost the total amount of energy available within the ranges of pressure and temperature employed. This transformation is being made in power-plant floor space very small in comparison with what would have been necessary with reciprocating engines. In fact, a reciprocating-engine power plant of a capacity like that of a number of the recent turbine plants would be so huge as to be almost unthinkable.

Mention has already been made of the velocities involved in the modern turbine. To illustrate these, we may cite the 1800-r.p.m. machine considered at the New York meeting, the pitch diameter of the last-stage wheel of which is 88 in. The linear velocity on this diameter is 41,500 ft., or nearly 8 miles, per minute. The upper economic

limit of generator rotor speed at present was said, by one of the speakers at the meeting, to be 24,000 ft., or about $4\frac{1}{2}$ miles, per minute. Steam passes through the last stage of a turbine like this at a velocity which challenges the imagination.

The volume of steam which has to be passed through the lowest pressure stage is also of a magnitude to attract attention. For example, a 30,000-kw. turbine with a water rate of say $11\frac{1}{2}$ lb. per kilowatt-hour must, with suitable pressure and superheat, pass $30,000 \times 11\frac{1}{2} \times 585$ (cu. ft. per lb.) = 202,000,000 cu. ft. of steam per hour, or 3,360,000 cu. ft. per minute, or 56,000 cu. ft. per second, into a condenser wherein a 29-in. vacuum is maintained. These data are quoted simply to impress upon the mind of the general reader the magnitude of the quantities involved. They are commonplaces, of course, to the engineer. The real point in the whole matter is that the size of turbine can now be selected on the basis of the lowest annual cost per kilowatt-hour, including all factors involved in the cost, with confidence that a high degree of reliability can be counted upon.

Companies Should Know the Value of Their Properties

NO ONE knows what the future legal basis of operation for most of our electric railway properties will be, whether on a service-at-cost franchise, partnership basis with the city, municipal ownership or a continuation of the present form of franchise with commission regulation of service and finances and supervision of fares. It would be only a rash guess for anyone to predict which of these forms of franchise will be most popular with the public which, in the end, will decide this question, or whether some other form of railway control will be preferred. But there is one thing which is certain, and that is that a valuation of the property will have to be made before any permanent basis for future operation can be established.

It seems to us, therefore, that one of the most important things to be done by every company which is not satisfied with its present rate of fare or has a short-term franchise is to get busy and have a valuation made. Otherwise, the need for one may come so quickly that the company will find itself unprepared. Valuations cannot be made in a day or a week, and any hurried valuation will be far more likely to leave out items which properly should be included than to include those which have no place in the appraisal. The latter items can be readily identified and thrown out, but omitted assets are not included because they are forgotten. A hasty valuation, therefore, is much more apt to be too low than too high.

Another question which may be asked is upon what basis should the valuation be made? To this our answer is that it should be made upon all of the present recognized bases for valuations, or at least the data should be located and made available by which a valuation made according to one basis can be corrected or changed to accord with another basis. Thus, a company should not be satisfied simply with a determination of the cost to reproduce new according to present prices but should determine the factor by which this total would have to be multiplied to accord

with the average prices of the last five years. The value of the intangibles should be appraised separately so they can be included or not as occasion may require. Accrued depreciation should be determined whether the management believes it to be a legitimate deduction from the value of the property for rate-making purposes or not, and an attempt should be made to learn from the records of the company the investment in the property and when made. Finally the current records of its company should be in such shape that the valuation can be brought up to date without too great difficulty.

The Romans had a saying, used so frequently that they contracted it to *verb. sap.*, meaning that a word to the wise is sufficient. We shall therefore not expand further on this subject.

The Spigot End Is Cost of Car Maintenance

AT ONE of the informal conferences at the recent convention there was a spirited discussion on the data so far available on the maintenance of automatic one-man cars. One or two of the men present showed a tendency to hold back on the installation of such cars until it had been demonstrated that they would cost little to maintain and last a long while.

This point of view was described long ago by the phrase: To save at the spigot but waste at the bung-hole. Surely, a scrap of paper and a bit of lead pencil ought to settle the question as to whether it makes much difference whether the cost of maintaining these cars is or is not as much per ton or per mile as older, less complex cars. The bung-hole combination is platform expense, power and accidents; the spigot item is maintenance. For example, in a certain city where the cost of running old cars is 20 cents per car mile, platform expense is 10 to 11 cents, power is 4 cents and accidents, 1.3 to 1.4 cents and maintenance, 2 cents or a total of say 18 cents for three items, leaving about 2 cents for the tax-gatherer and fixed charges. Now on the same property for the one-man car, the first three items total only 7 to 8 cents against 16 cents, because platform expense is 5 cents, power about 2 cents and accidents but 0.4 cent. In other words, the difference in operating costs exclusive of maintenance is 8 cents per car mile. Therefore, there is ample leeway for higher maintenance costs without serious impairment of net.

But what are the facts? The new cars average only 1 cent a mile for upkeep as against 2 cents a mile for cars that may be simpler in apparatus but which are twice as heavy and really too old to be economically maintained. The new cars through their very incorporation of the latest improvements in control, motors, air brakes, etc., are bound to cost less to maintain for their first two or three years at least; but let us remember that in the meantime they are also saving so much power, platform and accident expense and creating so much new traffic that the user of such cars could not only afford to pay more for maintenance but could also afford to put aside enough to pay for and replace the light-weight automatic cars within five years. Some more pencil and paper, please!

What Will the Car of To-morrow Weigh?

THE car of the future is certain to be built to light weight standards and stripped of all excessive material. Some leading equipment engineers have put the weight of the car of the near future at not more than 300 lb. per passenger seat. Others consider that a weight of 400 lb. to 450 lb. per passenger seat will be nearer that actually realized. Whether these figures are high or low it is certain that weight economy is one of the outstanding aims of the farseeing car builder of today.

The problem of reducing operating costs has been forced on the attention of all operating men for several years, and the present financial conditions of the electric railways of this country have emphasized still farther the necessity for economy. Weight reduction offers perhaps the greatest results in this direction. In the cars produced just previous to the year 1917, the weight per seated passenger for double truck cars was from 588 lb. to 694 lb. For single truck cars, the weight per seated passenger was from 474 lb. to 548 lb., and for ultra-light cars built for one-man car operation, the weight per passenger seat was from 345 lb. to 511 lb.

The use of these light cars has shown the officials of electric railways how little power is actually needed to transport passengers and also how much power has been wasted by heavy cars. Thus it pointed the way to the use of light cars of the safety type that are now coming into use so rapidly. The weight of the present standard safety car is about 425 lb. per passenger seat. While this is not as low as some of the ultra-light cars produced, it is a marked improvement over the weight of the single truck cars used just previous to the year 1916. Among railway men responsible for the maintenance of car equipment, there has been some disappointment because the saving in power consumption from the lighter weight has been in a measure offset by increases in maintenance cost. This is unavoidable to some extent, but efforts should not be spared to make the car of the most rugged construction consistent with weight reduction.

Improperly maintained track has always been regarded as one of the principal factors in the deterioration of cars, but in addition to those conditions which originate outside the car, there are many produced in the car structure itself. By avoiding excessive wear and by renewing parts before they have become worn to such a point as to produce excessive vibration in the equipment, the maintenance forces are helping to solve this problem. Manufacturers of equipment have also realized that they can assist in this work by reducing the dynamic forces originating in the car equipment itself. These changes give less pronounced results than those involved in reducing the weight of the car body. Nevertheless, taken altogether, their influence upon the weight of the car cannot fail to be of great importance. The practical accomplishment of the light car has been definitely established and a still further reduction in weight is sure to result without any sacrifice of the features of strength which are considered to be of paramount importance.

What the Brooklyn Report Shows

AT A TIME when the residents of Brooklyn are complaining about the payment of a second fare on the Brooklyn City Railroad system, charged because authorized under an old franchise, the report of Stone & Webster on the Brooklyn Rapid Transit system to Judge Mayer is published and shows to what a serious condition that company has been brought. Here is a property which only two years ago was earning more than \$5,000,000 over taxes and fixed charges and its underlying and guaranteed securities were considered suitable for fiduciary investments. Yet from this condition the rapid transit lines alone (based on estimates for 1920) are failing by about \$1,302,000 to meet their fixed charges, while the surface lines (for the same period) will not pay even their operating expenses and taxes by \$1,114,000. This sudden change from comparative affluence to abject poverty, it should be clearly understood, has not been caused by financial or operating mismanagement. It is due entirely to the change in the purchasing power of the fare charged, that is to say, to conditions brought about by the war and over which the company has had no control.

What will be the result? On this point the report is clear and to the point. Unless there is an increase in fares, the operation of many of the surface lines will eventually have to be discontinued because of their failure to earn operating expenses and taxes. Nothing less than an 8-cent fare, with a charge of 2 cents for transfers, will provide a safe margin for the operation of the surface lines as one system, with reasonable provision for upkeep. Even an 8-cent fare will not yield a fair return upon the actual investment in these lines or upon their reproduction value. As regards the rapid transit lines, without an increased fare they will not be able to earn even fixed charges, and it will take an 8-cent fare to cover the company's preferential and provide a substantial return upon the city investment, including cost of completion.

It is obvious, therefore, that unless the authorities wake up and settle this question promptly and on a permanent basis by giving the companies a living fare, Brooklyn will be bereft of many of its existing surface lines and will be so crippled as to its rapid transit lines that they will be unable to make the extensions which the transportation needs of the borough require.

We believe that there is every reason, from the standpoint of justice, for the grant of a higher fare to the Brooklyn transportation systems, but independent of this reason entirely, the grant should be made as a matter of self-interest by the city. Brooklyn is essentially a city of homes, and for this reason is perhaps more dependent than the average community on good transportation. Anything which prevents the wage earners of the family easily and quickly getting to their places of work will retard the development of Brooklyn. The rapid transit lines cannot reach all parts of the borough, and the bulk of all its local transportation will have to be carried on the surface lines. If some of these are abandoned and the others broken into even smaller

fragments than at present, with frequent changes of cars and additional fares at every change, a serious condition will be reached.

If we add to this that the rapid transit lines will be unable financially to carry out any extensions other than those covered by the present contract and must be operated by a receiver in the interests of the bond holders, Brooklyn will prove to be anything but a desirable place as a residence for anyone who lives at a considerable distance from his work.

One-Man Cars Demand Simplest Possible Fare System

ONE of the most gratifying features of more-service operation with one-man cars is the evident willingness of the riding public to facilitate the work of the car operator by taking more pains to have exact change ready. It does not take the passengers long to see that the speed of the getaway is largely up to them—a condition which is less obvious when there is a conductor at the back of the car. It is a fact, however, that odd fares necessarily reduce the proportion of passengers with exact change, thereby slowing down the schedule. A further slowing down is bound to occur if the operator has to handle and register a variety of cut-rate tickets, especially if some of the tickets carry limiting conditions as to hours of use. For these reasons it is extremely desirable that fare collection on one-man cars be reduced to the simplest possible terms.

In some cases, an attractive reduction in the price of tickets and intensive selling of such tickets will do the trick. In other cases, the sale of tickets in quantity might not do because it would be redounding chiefly to the benefit of rush-hour riders who are already being carried at or below cost. In instances of the latter kind, it might be found feasible to sell transportation either through a limited-ride coupon book or an unlimited-ride pass at a price based upon some definite number of rides.

It is not practicable in street railway service to limit such books or passes to the original purchaser, but this is no great disadvantage, as the purchaser could not pass the privilege along unless he failed to ride on it himself. The coupon book is costlier to print and is more cumbersome than the pass since it calls for more work by both passenger and car operator, but if it would give as tangible a check as the presentation of cash, however, it would not prevent the substitution of tickets for cash. The pass is exceedingly simple, calling for no stopping and tearing off of coupons by the holder, while the operator need ring up the presentation only for the sake of the traffic record. It is true that a pass does not give so tangible a check as the coupon book, but this should not prove an insuperable obstacle on one-man cars where all passengers face forward and so exert a moral influence that is impossible when the transactions go on behind their backs. Either class of transportation would carry the boon of eliminating the time-limit transfer which is annoying to the rider and expensive to the operator.

Blessings Brighten as They Take Their Flight

THE voters of Toledo must have felt very well satisfied a few weeks ago when a count of the ballots showed that they had won "a great victory" over the local traction company in approving an ouster ordinance to drive that corporation from the streets. At last those naughty "magnates" would be shown that the will of the people is supreme! Their self-satisfaction must have changed to a feeling something akin to chagrin a few days later when they awoke to find that the corporation officials actually had obeyed the demand of the people and had removed their cars from the streets. They said "traction barons" always were contrary anyhow—they obeyed the law just when the people didn't want them to do so. They should have known that the voters "were only fooling."

Undoubtedly the good people of Toledo were within their rights when they voted to abolish their street car system. Likewise the company management was within its rights in carrying out the expressed wish of the voters. The result of having both parties exercise their prerogatives is that the people of Toledo—voters and non-voters alike—had to walk. Of course the Toledoans had the alternative of paying from 10 to 25 cents for jitney rides, but this was not a suitable salve for their injured feelings.

Persons dependent upon local transportation in other cities ought to feel obliged to Toledo for bringing this lesson home. There has been much bragging about the power of the people to show the street car companies "where they get off." No one will be so bold, perhaps, as to gainsay this power. However, even the all-powerful public will take time for second thought when such developments as the recent event in Toledo show how an exercise of their rights may lead to distress. It sometimes requires a tieup of transportation to reveal the necessity of such facilities for community welfare.

Are We On to Our Jobs?

ALITTLE traffic investigation which we were privileged to make in a Mid-Western city of 60,000 to 70,000 people lately has set us to wondering whether electric railway operators are paying proper attention to the ravages of the commercial motor truck as a passenger carrier.

In this particular city, a number of factories have sprung up on the outskirts, most of them at or within easy walking distance of the terminals, the remainder extending out 2 or 3 miles. Owing to insufficient service on the existing lines and no service at all beyond the tracks, the factories have been obliged to improvise passenger vehicles out of their fleets of motor trucks. Morning and evening a few rough benches are set up and the employees are bumped to and from their jobs. It is true that they pay nothing for this service, but that doesn't mean that they would refuse to patronize comfortable cars if such cars were provided. A natural consequence of this absence of service is that the employees have no incentive to settle on the ample acres nearer the factory, for the good and sufficient reason that no real facilities are available for mid-day shopping and

evening pleasure travel. Better service would insure a better-rounded development of this community. For every long-distance rush-hour rider transplanted closer to his work, there would be a family of potential short riders for the off-peak periods.

So far as service over existing track is concerned, investigation disclosed that the remedy would be three-men, two-car trains during the rush hours and one-man cars the rest of the day. With the gradual development of housing nearer the later factories, the train service would eventually become unnecessary, whereas the all-day, one-man car service would become of increasing importance.

As for service to the factories a mile or two beyond the terminals, the immediate answer seemed to be in providing one-man buses as an integral part of the street railway system until the traffic developed would be sufficiently heavy to justify the extension of the tracks. Indeed, in this particular instance, the bus age of operation may be unnecessary if the city waives the paving tax and if the railway finds that it can use light-weight rail for light-weight car service. Then it will be on its job in earnest!

It's the Net per Car-Mile That Counts

IN COMPARING the car-mile earnings of two properties lately, we were amazed to learn that while the 20-cent per mile property was making money the 30-cent per mile property was losing money. Not only that; the property with the heavier gross per car-mile was operating in a town so small that its intake had to be considered excellent, whereas the property with the smaller gross obviously was serving a large community with a poorer riding habit.

The contradiction was resolved by a closer study of power, platform and schedules. The 20-cent property was running the majority of its cars on an energy consumption of about 1.25 kw.-hr. per car-mile instead of 3 kw.-hr. per car-mile because it had light-weight cars; it had a platform expense of 50 cents an hour instead of 90 cents because its cars largely were being operated with one man instead of two; and it was operating on a schedule speed of 10 m.p.h. instead of 8 m.p.h. because its cars were equipped with high-accelerating control, quick-braking apparatus, air-operated doors and other means for shortening standing time. On a car-mile basis the 20-cent property had a platform expense of but 5 cents a mile whereas the other property had a platform expense of 11½ cents a mile. Thus we see that because of the greater schedule speed of the automatized car, the platform expense was cut more than half, despite the payment of a bonus to the one-man car operator.

For this reason it was possible for the 20-cent property to risk a big increase in service for which it has been amply rewarded by public patronage. Its gross earnings per car-mile are a trifle less than they were before, but its actual margin between income and outgo is far greater than the other property which has gross earnings fully 50 per cent higher. For those who are still skeptical about modern one-man car operation, a little figuring of their margins is in order.

Some Experiences in the Development of Automatic Substations

The Author Tells of Several Schemes Which Were Tried and Abandoned in Bringing the Apparatus of One Manufacturer to a Satisfactory Degree of Reliability

By R. J. WENSLEY

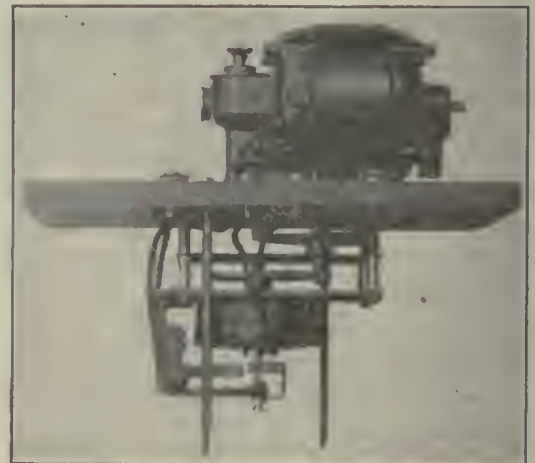
Switchboard Engineer Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

MANY difficulties have been met and vanquished in the development of automatic control for rotating machinery in substations. The requirements of such a control would at first seem to demand attributes so nearly human that the problem might at first glance be considered incapable of solution. On analysis, however, it resolves itself into the anticipation of as many probable conditions of operation that may be met, not so much in the ordinary daily run as in the time of abnormal stress that is sure to come to even the best of systems and machinery.

The average user of apparatus, such as the automatic substation, seldom has the chance to know any of the inside story connected with its development in the factory and with the troubles met in actual operation on systems with which he is not immediately associated. Often there are many interesting developments that considerably modify the original conception of the equipment in its evolution

station. The first equipment constructed for experimental purposes consisted of an assembly of standard switchboard relays, steel-mill-type contactor switches, and a motor-driven drum controller to establish the sequence of operations. The polarity of the converter was corrected by flashing its field from a small generator driven by the drum motor. This equipment was assembled and given an operating test with 300-kw. and 500-kw. converters on both 25 and 60 cycles. This first equipment worked fairly well, but was abandoned in favor of what was considered a more fundamentally sound scheme of switching.

With this first equipment it was necessary that the operations caused by the drum controller should not exceed the rate of acceleration of the converter. This necessitated that the drum speed be set for the longest time that might be required under the worst starting conditions, the result being that under normal conditions the time required for starting would be too long. To prevent this waste of time



AT LEFT, POLARIZED MOTOR RELAY AS FINALLY DEVELOPED. IN CENTER, TYPE OF CURRENT RELAY FINALLY ADOPTED FOR AUTOMATIC SUBSTATION. AT RIGHT, MOTOR OPERATED PRIMARY RELAY USED FOR SHUTTING DOWN STATIONS

from the first sketches to the perfected machine. This has been quite true in the case of the automatic substation and the purpose of this article is to acquaint those interested with some of the steps in design, as well as some of the troubles and their remedies, from the experience of one manufacturer of this class of equipment.

In the preliminary design, the major problem seemed to be in the development of a satisfactory means to start a synchronous converter from rest as an induction motor, to fix its polarity properly, and accurately to determine the earliest time at which it could safely be connected to the full voltage of its transformers. The converter was the first to be considered because of the great preponderance of its use in railway substations. The motor-generator control, while considered in theory, was not attacked in practice until after the converter problems had been solved.

The first scheme proposed was the use of relays to determine the various times at which connections should be changed to accomplish the starting and loading of the sub-

while starting, the drum could be speeded up to the shortest starting time and some means provided to stop it if it was about to reach the running position before the converter was in synchronism. As the best indication of synchronism in a self-started converter is the presence of unidirectional potential at the direct-current brushes, a polarized relay could be used to "signal" the drum when it was safe to proceed. If this polarized relay could be made definitely to determine the synchronous condition of the machine, then the drum controller would seem superfluous.

The first scheme proposed involved the use of a polarized relay for the purpose of determining synchronism; so it was decided to revert to that method of operation and to omit the drum controller. The abandonment of the drum and its driving motor left the small polarizing generator without a driving means. It could have been direct-connected to the converter shaft and operated all the time the converter was in service, but this was considered objectionable.

In the preliminary development it had been proposed to slip a pole automatically by means of the polarized relay. This method seemed to work out quite well in manual stations and it was therefore adopted as the standard method of polarity fixation. The development of a relay to respond to the change from alternating to direct current at the commutator and to indicate the polarity of the converter at the same time gave some little trouble. The first attempt was the use of a reverse-current relay built like a D'Arsonval movement except with powerful shunt field. This was very highly damped, but the long pulsations of the low-frequency potential at the commutator brushes were sufficient to cause operation of the relay before actual synchronism was reached.

To obtain the longer time element which seemed desirable, it was proposed to put a commutator on the relay movement and operate the contacts through a gear train. Since this was so obviously a direct-current motor, the relay was discarded and an ordinary motor was substituted. This motor was built with a permanent magnet to supply the excitation and a shunt coil to keep the magnet strength up to its maximum. The 10-in. oscillating-fan motor was found to be readily adaptable for the purpose, as its standard gear train was suitable for the application and it had the further advantage of being a well-proved piece of equipment.

This motor-relay was connected across the converter brushes during starting and soon proved itself exactly suited for the application. During the acceleration of

A contact device was connected to the reducing gearing of the motor relay, with four circuits. Interlocking relays were so connected that if the relay revolved in one direction the starting switch was opened and the running switch closed. If the relay revolved in the opposite direction, a direct-current relay was energized from the converter brushes. This relay in turn operated the field-reversing switches. When the shunt field of a converter is reversed, the direct-current potential dies away rapidly, and the converter hunts slowly backward and forward across the zero line.

The field-reversing relay was so calibrated that it dropped out as the potential fell to zero. This allowed the field-reversing switch to return to its correct position and the converter to reverse its polarity. To provide against failure to function properly, provision was made for repeated reversals of field to insure proper polarity. The motor relay, which was left connected to the converter during this operation, would slow down as the potential died away and would start up with the opposite direction of rotation when the converter reversed.

This whole scheme was so entirely simple and satisfactory that it was at once adopted as standard and all future developments centered on the use of the "polarized motor relay," as this device was called. The final form which this relay took is shown in one of the illustrations.



PRIMARY RELAY AS USED WITH INDUCTION REGULATOR

EXPERIENCE WITH INDUCTION REGULATOR WAS HELPFUL

For starting the station as a result of low trolley voltage, a standard piece of apparatus was adopted from the automatic induction regulator. The primary relay for this class of service, as shown in a second illustration, is subjected to very severe service conditions, as it is in almost continuous operation for twenty-four hours a day in its regular service, while the service requirements of the automatic substation would only need its operation five or ten times a day. It was therefore thought to be entirely safe to use this relay. What was overlooked, however, was that in its normal place this relay is operated from a potential transformer and is not subjected to line surges. In the automatic substation this relay was used on the ground side of a limiting resistor but the trolley surges proved too severe for its insulation. As a result three of these relays burnt up in rapid succession on the first equipment placed in actual service. A similar experience with the current relay, which was of the telegraph-relay type, was proof that automatic equipments would have to be constructed with a greater margin of safety than was at first considered to be necessary.

A simple and rugged current relay was adopted as shown in a third illustration. A similar relay with a shunt coil was adopted for the trolley voltage relay. There have been no insulation failures with either of these relays since their adoption.



AT LEFT, SWITCHBOARD FOR ELABORATELY INTERLOCKED CIRCUITS, AFTERWARDS GREATLY SIMPLIFIED. AT RIGHT, PANEL FINALLY DEVELOPED ELIMINATING UNNECESSARY INTERLOCKS

the converter the relay armature would oscillate, rapidly at first, then more slowly as the machine approached synchronism, until finally the armature would be revolving one revolution more or less in either direction just before the point of synchronism was reached. As the converter locked in, the motor armature would revolve continuously in one direction or another depending on the polarity of the converter. This offered just the means desired with which to operate the pole-slipping device.

To provide for shutting down the station when no demand existed, the current relay mentioned herein was used. However, this relay alone would not suffice since it was instantaneous in action and would shut down the station each time the load fell momentarily below its setting. Some form of time element was therefore found to be essential. The use of oil or air dash pots, or of air bellows, was considered impracticable due to their inherent unreliability which is especially great when long-time elements are required. The first form of time relay tried was a solenoid with a heavy moving core, to which a gear train and fan were connected by an over-running clutch. This relay would pick up instantly without driving the gear train but would have to drive the gear.

This relay operated many thousand times but it was of necessity built with rather delicate parts and its maximum time setting was about five minutes. It frequently stuck, due to the excessive mechanical friction as compared to the driving force, the weight of the plunger being considerable.

To secure a greater length of travel, this same principle was adopted, the operation being by means of a small motor which wound up a weight on a drum, the weight in turn

operation. This was successful and the relay illustrated was developed as a result. The same fan motor was made use of as in the polarized-motor relay. In this case it is used as a straight shunt motor. The gears, which in the fan motor operate the oscillating device, are here used as part of the reduction between the motor and the timing contacts.

The ratio of the fan motor gears is 198 to 1, and two 10 to 1 reductions are added below, making the total ratio 19,800 to 1. The contact arm is driven through a small and simple magnetic clutch, with the coil in series with the motor. The contact arm is driven forward against a light spiral spring, which immediately returns it to rest against a back stop, the position of which may be changed to alter the time setting of the relay. A variation of from three to twenty minutes may be obtained in this way.

The motor and clutch are energized through contacts on the load relay, which contacts are closed when the load falls to a predetermined value. This starts the motor and engages the clutch. If the load remains low, the moving contact arm will finally reach the contacts and press them together, this circuit shutting down the station. If, however, the load relay should pick up at any time prior to the time at which the contacts touch, then the motor will stop, the clutch will disengage and the contact arm will instantly return to its position of rest against the back stop. This prevents any cumulative effect, as the relay must always start from zero position no matter how brief the demand for load on the station may be.

HOW "SNEAK CIRCUITS" WERE ELIMINATED

The earlier "circuit diagrams" were quite complicated and abounded in sneak circuits which showed up at most inopportune times. The tendency at first was to add an interlock on one of the relays whenever any circuit trouble was experienced. This resulted in loading the circuits up with multiplied chances for trouble and loading the relays up so that they would hardly operate. At least two equipments were built in this manner, of which an example is shown in one of the illustrations.

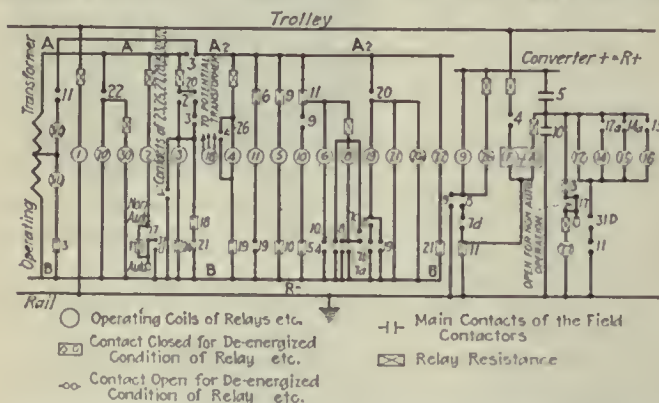
A determined effort was made to simplify the circuits and a great number of straight-line diagrams, similar to the one shown, were made up while eliminating the sneak circuits, which are readily visible in this type of diagram. At the same time, most of the objectionable interlocks were removed, the result being the panel illustrated.

This change fortunately was made while the two equipments mentioned were still in the works. These were scrapped and new panel assemblies were made using the simplified diagram.

In the first equipments shipped many aggravating troubles were experienced which were not directly attributable to the automatic control but which caused some unfavorable comment. For instance, the wiremen on the first equipment in their anxiety to do an exceedingly neat job of wiring bent the wire at very sharp right angles, thus breaking the insulation and causing some very nasty breakdowns in service. On the oil circuit-breaker mechanism, a low-voltage tripping device was used of exactly the same design as those used for years in ordinary circuit-breaker practice. This would not stand the unusual shocks to which it was subjected in automatic substation service and a new type of trip had to be adopted.

SOME DISCONCERTING TROUBLES IN EARLY MACHINES

The first machine to be operated by this type of automatic control was a 500-kw., 25-cycle, 600-volt non-commutating-pole converter of relatively recent design, having



SIMPLE STRAIGHT-LINE DIAGRAM, ELIMINATING "SNEAK" CIRCUITS

1. Under-voltage D.C. relay.
2. Low-voltage delay A.C. relay.
3. A.C. shunt relay.
4. A.C. shunt relay.
5. Field contactor "normal field."
6. A.C. starting contactor.
- 7a. Armature of polarized motor relay.
- 7b. Field of polarized motor relay.
8. A.C. shunt relay.
9. D.C. relay for "field reversal."
10. Field contactor "reversed field."
11. A.C. running contactor.
12. D.C. line switch.
13. D.C. series underload relay.
- 14, 15, 16. D.C. line resistance shunting switches.
- 12a, 14a, 15a. D.C. accelerating relays.
17. Two-pole D.T. knife switch.
18. Reverse-phase and low-voltage A.C. relay.
19. A.C. shunt relay.
20. Main oil switch in A.C. power line.
- 20a. Low-voltage release on 20.
21. A.C. dash-pot relay.
22. Control contactor for item 20.
23. A.C. overload relays.
24. Overspeed device on converter.
25. Bearing thermostats.
26. Field reverse limiting relay.
27. Underload delay relay.
28. Grid thermostat (for converter).
29. Replica thermal relay.
30. Lockout relay.
31. Brush-lifting mechanism.
32. D.C. reverse-current relay.

EXPLANATORY NOTES

The polarized motor relay No. 7, consists of a polarized motor driving a rotary-type switch. When during the starting operation the converter voltage builds up with the correct polarity, the switch contacts are made in the order a, b, c, d, etc. When the converter voltage builds up with wrong polarity these contacts are made in the order of d, c, b, a, etc.

If after three trials of reversing the converter polarity, the voltage again builds up reversed, the contacts of relay No. 26 are closed, thus opening the starting contactor.

No. 6 through the opening of No. 4, and a complete new start will then be made.

No. 30 closes its contacts up on the third power impulse produced by the closing of No. 22, unless mechanically reset by the closing of No. 16.

driving a gear train and fan on the downward trip through a ratchet. The motor remained energized while the load relay was in contact, and started to unwind against the time element when the load relay opened. This relay was actually shipped with the first equipment but gave trouble due to excessive friction and to pitting of the motor commutator at the point where the brushes rested in the energized position. In this relay also the ratio of torque to friction was entirely too low.

It was then decided to experiment with a motor-operated time relay in which the motor would run during the timing

distributed damper bars for starting. These bars were fastened to the end rings by bolts, and the unusually frequent starting service resulted in the loosening up of the end ring connections until finally the converter would not start. Prior to the time when the entire failure to start was observed, a puzzling circumstance occurred which caused much thought and worry before it was understood. The machine, upon coming up with reversed polarity, would go through the sequence of operations in the usual manner until the field switches would reverse. The direct-current voltage should then drop to zero, at which point the field-reversing relay should drop out and normal field should be restored. In this case, the converter would slip partly out of step and then lock with the direct-current voltage only part way down. This was sufficient to hold the field-reversing relay, and the converter would run on the starting tap with field reversed until tripped out by hand. This trouble entirely vanished when the damper winding was repaired.

This repair was accomplished by the use of an oxy-acetylene torch and silver solder, the result closely resembling the electrically brazed joints made in the most modern types of converters. This same trouble with the joints of a cage winding was experienced with the rotor winding of a starting motor used with an old converter, for which automatic control was supplied. This winding was repaired in the same way.

In connection with motor-started converters many peculiar problems were met due to the necessarily different starting methods and to the inherent characteristics of this form of converter. These machines are brought up to speed by the motor and then thrown onto the line through a reactance regardless of the phase relation. The ordinary pole-slipping method does not always work with these machines as the direct-current voltage goes much higher than in the self-starting type. To get some of these machines to reverse, it is necessary temporarily to insert some non-inductive resistance in the circuit so as to loosen the coupling between the converter and the line. The converter will then slip a pole much more readily than when reversed with only reactance in circuit. This is not true of all motor-started converters and experience has shown that each case has to be considered separately.

A BUTTERFLY CAUSED ONE SHUT DOWN

The only failure to function properly which has been experienced that was chargeable to insect life was in the station containing the motor-started converter. A butterfly crawled into the arc chute of the running-field contactor and prevented the closing of the field circuit, which in turn prevented the station from coming on the line. In a way the experience was valuable, since it emphasized this hazard and all possible changes were made at once to guard against its repetition. It also suggests the importance of properly screening all ventilating openings as an additional safeguard from this source of trouble. Small-mesh screening is most desirable and its use should be considered in the design of substations. Of course, larger ventilating openings are necessary due to the choking effect of the small-mesh screening.

The only case of trouble that caused any apprehension as to the fundamental scheme of automatic switching, was due to a defective direct-current contactor which failed to open, resulting in material damage from overspeed to the 300 kw., 60-cycle converter it controlled. Inspection and experiment, however, showed that everything was correct and had functioned properly except the contactor. This had failed to open due to improper assembly. Aside from the fact that the automatic switching was entirely vindicated, it was even a greater satisfaction to be able to

have this substation in full automatic operation in only a little more than a week after the accident. This was accomplished by shipping a new converter form stock half way across the continent by express.

While a number of detail difficulties, as enumerated, have been experienced, the fundamental principle of switching only in accordance with the electrical condition of the machine controlled has proved to be absolutely correct. Experience has further demonstrated that simplicity is very necessary in the apparatus and in the control circuits to make the automatic substation a success.

Gear Manufacturers Discuss Standardization

Recommended Practices Were Adopted for Gears and Pinions for Railway Service and Other Industrial Applications

THE semi-annual meeting of the American Gear Manufacturers' Association was held at Boston, Mass., on Oct. 13 to 16. Recommended practices were prepared and proposed for adoption covering composition gearing, gears and pinions for electric railway service, bevel gearing, limits for holes in gears, and roller-chain and sprocket-wheel standardization.

In the case of composition gearing, standards were offered for adoption covering four classes of gears or pinions, namely, rawhide, fabroil, bakelite and fiber. Charts were prepared and submitted covering the minimum allowance between bottom of teeth and bore, thickness of brass retainers, diameter and number of rivets, and face width of rawhide additional to that of metal mates. This report was accepted in its entirety by the association excepting one section relating to horse-power, action upon which was postponed.

The recommended practice for electric railway gears and pinions as proposed was based upon the specifications of the American Electric Railway Engineering Association, Sections Et 3b, Et 14a, Et 15a, Et 16a and Et 17a.

In addition a further recommendation was submitted as to the proper method of installing railway pinions, as follows:

PUTTING ON RAILWAY MOTOR PINIONS

Many of the pinion failures on electric railway motors are caused by putting the pinions on incorrectly.

Driving a pinion.—It is generally believed that if a pinion is shoved on to the shaft and the nut is tightened, the pinion will run satisfactorily without loosening. Experience has shown that in order to obtain satisfactory operation, pinions should drive their gears through the "press fit" or "shrink fit" on the shaft and not through the key. The key acts merely as a safety device should the pinion accidentally loosen. The desired fit for the pinion can be had by heating or by pressing.

Precautions.—The following points should be observed when putting pinions on railway motor shafts with taper fit: (a) The shaft should be clean and free from burrs or swellings. (b) The pinion bore should be clean and free from burrs. (c) The fit of the pinion bore should be in contact with at least 75 per cent of the surface of the taper fit on the shaft. This can be checked by rubbing Prussian blue, thin red lead and oil, or thin lamp black and oil on the pinion bore and fitting it on the shaft. (d) After the above points have been taken care of the pinions should be put on the shaft cold to make sure that the keyway in the pinion is the proper size for the key mounted on the shaft, and that the pinion does not ride

or bind on the top and sides of the key and will not ride the key when pressed further on.

The keyway on the pinion can be 0.002 in. larger than the key but no smaller. There should be at least $\frac{1}{4}$ -in. clearance between the top of the key and the bottom of the keyway in the pinion. The corners of the key should not cut into the fillet of the keyway. To prevent this, the corners of the key should be rounded.

Pinions up to 3-in. bore should be heated in boiling water for thirty minutes, and those with 3-in., or larger bore for sixty minutes. When the pinion has attained the temperature of the boiling water it should be taken out of the water and the bore quickly wiped clean. Before the pinion has had time to cool it should be tapped on the shaft with a 6 or 8-lb. sledge hammer, using a heavy piece of wood or copper between the pinion and the hammer. This sledging is not to get a driving fit, but to make sure that the pinion is "home" and well seated. Three or four taps evenly distributed around the pinion end should be enough. The pinion nut, with lock washer, can then be screwed home tight with a wrench having a purchase or lever arm of 3 or 4 ft.

A suitable pinion-heating arrangement can be easily made, the water being heated by an electric heater, or a gas flame or a steam coil could be used.



TIE LIFTER DEVELOPED BY TRACK FOREMAN OF IOWA COMPANY

To prevent rusting and to insure a clean surface at the fit, washing soda should be added to the water in the proportion of $\frac{1}{4}$ lb. of soda to 5 gal. of water.

By following these directions it is possible to put a pinion on an armature shaft so that it will "stay put" and drive through its fit under the very hardest pulling from the motor.

ACTION ON COMMITTEES' REPORTS

The report abstracted above was accepted in its entirety as recommended practice with provision for furnishing certain additions, such as drawings, etc.

The proposed standards offered for bevel gearing were confined largely to gears up to 20 in. in diameter as distinguished from larger gears. Sections on shafting, length of face and length of bearing were accepted as recommended practice. The section on limit of application and a table giving the proper amount of back-lash was referred back to the committee.

The recommendations of the committee on holes for gears included classes for air craft, printing machinery, automobiles, pumps and hoisting machines and for general jobbing gears. This was accepted as recommended practice.

A report submitted by the roller chain sprocket wheel standardization committee will be printed later by the association and submitted to the membership. No action beyond "Permission to print" was taken at this meeting.

New "Tie Nipper" Reduces Spiking Difficulties

A NEW TOOL which greatly simplifies the operation of spiking ties and makes it no longer necessary to resort to the bar and block to hold the tie up against the rail during spiking has been developed on the property of the Tri-City Railway, Davenport, Iowa. The usual process is not only uncomfortable for the man on the end of the bar, but requires the use of a man and bar on each side of the tie. The new device requires only one man for this purpose and the leverage is such that no jar is felt by the operator. It consists of a lever with a side projection or head to fit over the ball of the rail and act as a fulcrum while a foot at the short end of the lever goes under the tie. The particular function of this device is to clamp rail and tie together firmly while the spiking operation is being performed.

The "nipper" as it is called, consists of four parts, a lever, handle, head and foot. These are put together with pins and cotter-pins for purposes of interchangeability and adjustment to various types and sizes of rail. The foot is a casting and is made in various lengths for any height of rail. For a 7-in. rail the distance from the pivot in the bar to the top side of the horizontal foot is 10 in. The



SPIKING TIE HELD SECURELY IN PLACE BY NEW "TIE NIPPER"

lever or bar to which the foot is attached is $\frac{1}{4}$ in. x 2 in. and a 1 $\frac{1}{4}$ -in. pipe which fits onto the end gives a total length of 6 ft. The head which fits over the rail is also a casting and is made in a sufficient number of types to fit any rail. This head is set 4 in. from the end of the bar.

In operation the foot is first placed under the tie, the head is then placed over the ball of the rail and by means of the handle lever the tie is held firmly against the rail base while being spiked. An actual test made over a given length of track resulted in the accomplishment of the work with the "nipper" in one-third the time necessary when the old method was used. At the time of the test the trackmen did not know a comparison was being made and were not familiar with the new device.

The fact that the handle is quickly detachable makes the tool convenient for the tool box. The total weight is about 26 lb. as equipped for use with a 7-in. T-rail. The device has been patented by its designers, Messrs. Emmons and Johnson of the Davenport track department.

C. W. Rice, chairman of the employment bureau conducted by the engineering societies, reports that during the ten months ending Sept. 30, 1919, the bureau interviewed 17,083 men, registered 4858 men and 1988 positions, and placed in positions approximately 1000 men. The work is to be continued.

Fares Increased in Milwaukee

Commission Estimates Normal Expenditures and Increases Fares to Cover Deficit—Changes in Accounting Methods Ordered to Pave Way for Establishing Fares on an Automatic Cost Basis

THE Wisconsin Railroad Commission on Oct. 30, 1919, handed down a decision of much importance affecting the fares, service and accounting methods in Milwaukee. A brief note regarding this decision appeared on page 808 of the issue of this paper for Oct. 25. From the full report of the decision, now available, the following longer abstract has been prepared.

On July 25 the company filed a petition for a revision of the rates of fare and zone limits within the Milwaukee single-zone area and adjacent suburban zones, claiming a reasonable return was not being received under the previous order. Subsequent to the filing of this application, the question of wages paid in the transportation department was brought before the Board of Conciliation of Wisconsin, in accordance with the State law (Chap. 530 of 1919), and this board filed a schedule for increased wages with the Railroad Commission, which subsequently approved it, although the order required by the above-mentioned law had not been entered. Increases in wages were not confined to the transportation department but other collateral wage increases grew out of this adjustment. The estimated total increase in Milwaukee and suburban areas was \$710,000. If the Racine and the interurban companies were included the increase would amount to \$829,000.

The state law referred to reads:

In the event that such dispute shall arise between any public service corporation and its employees of any class, division or grade, and said Board of Conciliation shall investigate and report thereon as herein provided and determine the wages, hours of labor or working conditions to which such employees are reasonably entitled, such determination shall be immediately submitted to the Railroad Commission of Wisconsin, which Railroad Commission shall without delay further investigate the said matter and make and file its determination therein, confirming or modifying the report of said Board within 45 days after receiving the same. If the earnings of such public service business in which such employees are engaged are found to be sufficient to meet the cost of making the determination of said Commission effective without depriving said corporation of a fair return upon the capital employed in such business as determined by the Railroad Commission, said Railroad Commission shall order such public service corporation to make effective the wages, hours of labor and working conditions so determined by it to be fair, equitable and just, otherwise the Commission shall provide for such a revision of the rates, tariffs and charges of such public service business as will enable it to meet such cost and yield a fair rate of return upon the capital employed therein, as determined by the Railroad Commission, which order of the Railroad Commission shall be subject to review in the manner now provided by law, etc.

ESTIMATES FOR YEAR 1920 IN SINGLE-FARE AREA

The commission made a forecast, designed to indicate the amount by which the present fares would fail to yield an adequate return upon the fair value of the Milwaukee city and suburban railway property. Determining this the commission indicated the specific fare increases considered necessary to provide the additional revenue requirements. The commission used as a base the figures for three months ending July 31, 1919, due consideration being given to seasonal variations and to increases in the cost of labor and material.

The operating revenue for the three months ending July 31, 1919, were taken as being representative of any

quarter, and the yearly revenue estimated therefrom. This was estimated to be \$6,340,986.

In estimating the operating expenses for a normal year the various items were considered separately and not necessarily in the same manner. In carrying out this idea the commission made an audit of expenses for three months ending July 31, 1919, and considered first the expenses if based on the price levels of July 31, 1919, and added thereto wage increases effective Aug. 1, 1919, or which were expected in the near future.

An audit examination, the commission stated, in many cases has secondary value as the questions involved relate not only to the character of expenditures which may be properly considered maintenance, but also to the amount of maintenance which may properly be considered normal for any one year. The most reliable index was the average annual expenditure for actual maintenance work over a period of years, if due regard was given to changes in the cost of labor and materials. Unfortunately, the accounts of the Milwaukee company are not so kept as to show charges which should have been made to property and plant account or depreciation reserves, and therefore any allowance for maintenance based on such averages would unnecessarily be higher, inasmuch as expenditures that should have been capitalized are included.

ESTIMATES OF EXPENSES FOR 1920

Estimates for way and structures and equipment accounts were worked out on two bases, namely:

The first basis used the average maintenance figures per car-mile over a period of years reduced to a level of pre-war costs, and to this cost the estimated increase of present-day costs over the pre-war costs was applied. This figure was then adjusted to show the effect of wage increases already allowed or anticipated within the period for which the estimate was made. On the second basis the estimated increase in the cost of labor and materials for 1919 over 1916 applied to adjusted figures for the calendar year 1916, so as to make the estimate on July, 1919, price levels. To this figure were added the wage increases either already allowed or anticipated within the period for which the estimate was made.

To make allowances for the charges which the commission claimed should have been capitalized or cared for by the depreciation reserves, an amount equal to the difference between these two bases was deducted from the figures under the estimate based on the figures for the first half of 1919 adjusted to the calendar year 1916. To this difference was added the same allowance for increase in wages effective during the period of the estimate.

Investigation of way and structure accounts showed that December, 1916, price levels were approximately the average for the period July 1, 1908, to June 30, 1917, and the cost for the last half of 1918 averaged 47.97 per cent higher. In July, 1919, labor showed a 64.39 per cent increase and materials 48.77 per cent increase over December, 1916, while the composite figure indicated a 56.25 per cent increase.

Investigation of equipment accounts showed that figures for the year ending June 30, 1918, must be reduced 29.39 per cent to be on a 1916 cost basis and that for the last

half of 1918 costs had to be reduced 58.7 per cent. Labor in July, 1919, increased 105.26 per cent over December, 1916, and materials 60.76 per cent, while the composite figure showed an increase of 79.87 per cent.

Expenses for traffic, cost of power, conducting transportation, general expenses and undistributed expenses were figured by the commission for the three months ending July 31, 1919, stated on an annual basis. An allowance for depreciation and a 7½ per cent return was allowed in the cost of power. To the other items increases in wages anticipated during the coming year were added. To determine the amount for depreciation the commission took the value as of Dec. 31, 1918, of the city property, exclusive of power plant, with additions since made. This gave a valuation in the single-fare area of July 31, 1919, of \$15,645,534.

At the allowable rate per annum, 2.82 per cent, less the company's charge to the railway reserve for the quarter ended July 31, 1919, the annual amount for the depreciation reserve was estimated to be \$400,766.72.

The taxes for the quarter were increased four times to meet the year's estimate. The commission noted that with any increase in net income, taxes would likewise be in-

TABLE I—ESTIMATE FOR EXPENSES, WAY AND STRUCTURES AND EQUIPMENT

On basis of twelve and one-half years average:	Way and Structures Account	Equipment Account
Miles of single track operated.....	180.4	.....
Operation—1916 prices, per mile.....	\$199.68—\$30,022	.....
1919 prices increased by.....	62.25%—\$56,285	.....
Maintenance: Car miles operated, seven months ending July 31, 1919.....	9,767,978	.....
Car miles estimated for year Dec. 31, 1919.....	14,745,105	.....
1916 prices, per car-mile at.....	1.15c—\$192,660	1.68c—\$281,318
1919 prices, increased by.....	56.25%—\$300,889	79.87%—\$506,006
Total costs for 1919—labor and material.....	\$357,174	\$506,006
On basis of 1916 adjusted figures:		
Actual expenditures, 7 months ending, July 31, 1919.....	\$273,774	\$1,400,000
Estimate for year, based on average for 1916-7-8 of.....	62.84%—\$523,068	51.32%—\$721,643
Wage increases July 1 and 16, 1919....	\$11,982	\$46,861
Estimate for year on 1919 prices.....	\$535,050	\$708,044
Amount that should have been capitalized or charged to deferred maintenance.....	\$177,870	\$262,038
Net maintenance.....	\$357,174	\$506,006
Wage increases to be added:		
Granted since August 1, 1919.....	58,678	.....
Anticipated during period.....	26,438	52,917
Estimated wage increases on basis of....	66.76%—\$50,823	65.88%—\$34,862
1920 estimate allowed.....	\$413,907	\$540,808

creased due to the federal income tax law. The non-operating revenue was estimated to be \$22,178.64. In Tables I, II and III is given in detail in tabular form the basis of the commission's estimates—together with a summary to show the estimated revenue needed in the city area.

MILWAUKEE SUBURBAN RAILWAY

In considering the rates of fare in the suburban zones the commission believed weight must be given not only to the theoretical cost of rendering service in that area, but also to the connection of that area with the flat-fare city area. Rush-hour or tripper service is largely confined to the flat-fare area, but the cost of such as is operated into the suburban zones is apportioned by the company on the car-hour basis. The commission did not agree that this method was entirely correct but did say that if a suburban rider is to enjoy the advantages secured through the attainment of a better load factor on suburban cars during the off-peak hours of the day and if he is to enjoy the same transfer privileges that a city rider enjoys, he must also expect to bear at least some portion of the cost of the expensive tripper service.

The commission further stated that it did not believe that the suburban area at the present rates of fares was self-

TABLE II—ESTIMATES FOR EXPENSES—TOTAL WITH DEPRECIATION AND TAXES

Item	Three Months Ending July 31, 1919	On Annual Basis	Wage Increase Anticipated	Total
Traffic.....	\$1,941	\$7,764	None	\$7,764
Cost of power.....	207,559	830,236	None	830,236
Conducting transportation.....	583,043	2,340,173	487,078	2,827,251
General expenses.....	43,537	174,147	10,364	184,511
Undistributed expenses....	68,627	274,509	5,770	280,279
Total.....	\$906,707	\$3,626,829	\$503,212	\$4,130,041
Way and structures and equipment from Table I.....	.....	.....	.....	954,866
Depreciation at 2.82 per cent of valuation.....	110,301	.....	.....	.....
Less company's charge....	10,109	.....	.....	.....
Actual.....	100,192	400,767	.....	400,767
Taxes.....	54,190	216,763	.....	216,763
Total operating expenses and taxes.....	.....	.....	.....	\$5,702,436

supporting; for it would be entirely possible to zone the system in such a way that certain zones could never be self-supporting, just as it is undoubtedly true that certain city lines yield a much smaller return than do certain other lines operating within the single-fare area. These facts lead to the conclusion that a rate within a certain zone or on a certain line is not necessarily too low merely because it is insufficient to make that area or that line, considered by itself, yield a fair rate of return. The question of proper rates of fare for the suburban area therefore, is one that cannot be decided alone on the narrow grounds of the theoretical cost of service. The suburban area of any city railway system always represents the thinly settled portion served, and if the needs of a growing community are to be adequately served, it is inevitable that extensions must be made before the population in those areas has reached a density that will make the extensions when built immediately profitable, if only the revenues earned within the suburban zone are considered. To adopt a policy of making these extensions only when and as they become immediately profitable, would inevitably cause the business and social interests of the community to suffer.

The present relations existing between the city of Milwaukee and the suburban municipalities in respect to their street railway transportation requirements are such that some portion of the shortage in revenue now resulting from the operations of the Milwaukee suburban railway may properly be borne by the city railway and any increase in fares in the flat-fare area automatically results in an increase to the suburban rider, as a very large percentage of rides originating in the suburban area terminate within the flat-fare area.

Figures presented for the suburban area are purely an estimate inasmuch as the company does not keep on its hook separate accounts covering the expenses of the suburban railway area.

ESTIMATES OF REVENUE AND EXPENSES

The company's figure of \$302,939 for operating revenue for the year ended July 31, 1919, was accepted by the commission.

The character of the way and structure maintenance work in the suburban area made it impossible to follow

TABLE III—SUMMARY OF ESTIMATED REVENUES AND EXPENSES—CITY AREA ONLY

Operating revenue.....	\$6,340,986	
Operating expenses.....	6,702,430	
Operating income.....		\$638,550
Non-operating revenue.....		22,179
Gross income.....		\$660,729
Value of Milwaukee city property exclusive of power plant.....	\$15,645,534	
Add for materials and supplies.....	500,000	
Total valuation.....	\$16,145,534	
Estimate revenue needed to earn 7½ per cent and pay operating expenses, without making allowance for increased taxes and high recession rate.....		\$1,210,916
Deficit to be made up in suburban area.....		\$550,186

the plan used in the city area. Lacking any definite basis for determining expenses in the suburban area the company's figures for the seven months ended July 31, 1919; were accepted and raised to an annual basis, to which increases in wages actually made or anticipated were added.

The commission did not make any elaborate reinvestigation of the early fare question and only considered the period since its order of Aug. 23, 1912. Taking the period of Aug. 23, 1912, to date as a whole, the commission states, the company has not earned excessive earnings over a reasonable return. If it had previous to that time, whatever earnings there were were under lawful rates and were the property of the company, which it was entitled to use in any lawful manner. To be sure this question of early earnings has a bearing on questions of going value, etc., but to order now the company to forego a reasonable return for a fixed period to absorb past calculated excess earnings would not only in the opinion of the commission be a violation of the Constitution of the United States but would be establishing a principle against public policy and against the interests of the riding public in the city of Milwaukee. It could only result in crippling the company financially,

TABLE IV.—SUMMARY OF EXPENSES SUBURBAN AREA

	Other Figures on Annual Basis	Total Expenses Stated on Annual Basis
Ways and Structures:		
Actual expenses for seven months to July 31, 1919	none	\$72,148
Equipment:		
Car-miles for seven months to July 31, 1919	614,585	1,053,574
At 1916 prices per car-mile	1.08c.	\$17,700
At 1919 prices—Increase of	79.87%	\$1,837
Wage increase anticipated	1,794	33,381
Power:		
Car-miles three months to July 31, 1919. 275,186		
Cost on per car-mile basis	4.56c.	1,053,574
Transportation expenses:		
Basis \$1.52222 per car-hour		145,127
General and Undistributed Accounts:		
In city this item was 10.06 per cent of other accounts above		30,074
Taxes:		
Computed on ratio of valuation		10,498
Depreciation:		
Calculated on 2.82 per cent property value.		37,244
Total		\$382,761

TABLE V.—ESTIMATE OF REVENUE REQUIREMENTS—
SUBURBAN SERVICE

Operating revenues	\$302,939
Operating expenses, taxes and depreciation	882,761
Net deficit	\$70,822
Valuation of suburban railway as of July 31, 1916	\$1,320,698
Adding allowance for materials and supplies used in April 4, 1919, decision	42,500
7½ per cent return on valuation of	\$1,383,198
Additional revenue requirements	\$182,062

making it impossible to carry out not only the very provisions of this order for giving adequate service, but would be very likely to interfere with other improvements found necessary for serving the public in the future.

SYSTEM OF FARES

The commission found that the most difficult question was in raising the increased revenue as the basis of fares cannot be placed strictly upon the income account by zones. This would be unfair to the outer zones and give to some extent the single-fare area an advantage of density of traffic and lower costs than would obtain were it not for the contributing traffic from the outer zone areas. No traffic study has been presented upon which an ultimate conclusion as to actual costs can be based, if the contributed density of traffic in the inner zone is considered. Economic and social considerations must also be considered as well as established business and riding habits, and residential congestion in the single-fare area ought not to be furthered by a system of fares that would discourage the outward growth of the city. However, the additional cost for a long haul should not be overlooked, and it is believed that some system of

fares, not now in effect, can if properly treated give recognition to the increased cost of hauls into suburban areas, take into account the decreased cost in the single-fare area through traffic originating in the outer zones and give consideration to economic and social conditions. The commission believed it unwise to introduce another zone within the single-fare area, inasmuch as the present area is not large, the outer limit being only 3½ to 4 miles from the Public Service Building. To do so would introduce serious problems in handling fare collections and would greatly influence the trend of traffic throughout all the areas under consideration.

A 6-cent flat fare in the single-fare area would probably produce the necessary revenue and would also for some time at least discourage riding, especially the short haul, and any cash fare using multiple coins is likely adversely to affect the time of loading. It is impossible to avoid multiple coin fares, but a 6-cent cash fare without reduced rate tickets does not recognize the principle that frequent riders are entitled to special consideration and should have some advantage over the occasional riders.

Hence, 7-cent cash fare in the central area and 3-cent zone fares were allowed with tickets in the single-fare area sold in lots of six for 35 cents and eighteen for \$1, in order to give the most frequent riders the lowest fare. The commission says it sought to put in ticket rates on a basis which it estimates will produce the necessary revenue. The commission believes that two classes of tickets should be sold so that those who make the largest investment would receive the greatest discount. Inability to forecast the riding on various tickets led the commission not to make this part of the order final. A further study of the revenues accruing under this order is to be made and within a reasonable time the final order regarding ticket rates applicable to the single zone area will be entered.

Riding since Jan. 1, 1919, has increased a great deal and has resulted in far more favorable conditions than existed in October and November, 1918. The commission believes that increased traffic is to be looked for and that additional cars will increase riding and revenues. The careful following of the accounting procedure fixed by the commission should make it possible readily to adjust the ticket rates, especially those at the minimum rate from time to time so as to meet fluctuations in the cost of service.

Metal tickets, the commission acknowledged, were more convenient for the company to handle, but if sold to the car riders in large quantities are an inconvenience. While tokens may possibly prove satisfactory for the first fares established, paper tickets will be more convenient for those riding at the minimum rate of fare.

Between the Cudahy depot and the Bay View district the commission, although against overlapping fare zones as a principle, did establish this plan during rush hours on special cars or trains. Any questions of difficulty in fare collection, it was believed, could be obviated by not running cars south further than Mitchell Street.

The commission also suggested a commutation ticket to South Milwaukee and left it to the company to suggest a rate.

TREATMENT OF RESERVES

Something should be said, the commission continues, in favor of a requirement that depreciation reserves shall be represented by depreciation reserve funds, but the commission does not believe any good public policy would be served by a segregation of such funds, at a moderate rate of interest, to be used only to replace property retired from service, but the public interest requires such funds to be used for corporate purposes, especially for extensions and additions to property. The funds in effect can be restored as capital issues are made. No matter how the

funds are used the commission is of the opinion that they should draw not less than $3\frac{1}{2}$ per cent interest, which should be credited to the reserves, inasmuch as depreciation is figured on a corresponding sinking fund basis.

The commission also believes that a further development of traffic can be secured in the non-rush periods, and that economies can be brought about by short routing.

ADDITIONAL CAR EQUIPMENT

In the June 1, 1918, decision the commission retained jurisdiction as to the service. The commission held that the primary duty of a public utility was to render adequate service. Adequate service was as much a corollary to fair rates of return as was the right to demand a fair rate of return for adequate service rendered. More equipment was necessary, it now claimed. The commission engineer reported eighty-three cars needed to fulfill the requirements of the standards of service. It was estimated that 100 more cars having a seating capacity of 5000 seats will be needed by November, 1920.

DOUBLE TRANSFERS

The commission claims that it has brought up the need of extending the use of double transfers repeatedly. The June, 1918, order also referred to this, and the company was expected to submit a proposal for the commission to consider. The company was given until Nov. 24, 1919, to install a transfer system allowing passengers to reach their destination without payment of a double fare. The commission finds that the extension of the double transfers is necessary for this purpose and allowed the company to submit a statement showing the restrictions which it thought necessary to prevent abuse. The commission, retained jurisdiction, to pass not only upon these matters, but on all those growing out of the extension of the use of the transfers and for the purpose of requiring changes from time to time, as may be necessary, to bring about a more general transfer system throughout the city of Milwaukee.

ORDER OF THE COMMISSION

In conclusion, the commission ordered the company to install a new accounting procedure, effective Jan. 1, 1920, to conform to the accounting practices set forth in the previous audits prepared for the commission by its audit staff.

In the single-fare area an allowance of 20 per cent of the operating revenue was made to cover way and structures and equipment maintenance and depreciation, exclusive of power property. The charge for depreciation is to be the excess over and above the monthly expenditures for maintenance, plus an allowance of 2.82 per cent on the valuation of the power plant property devoted to the city area.

The commission states it has given no consideration to the ratio between maintenance expenses and depreciation allowances to operating revenue, but inasmuch as the current price levels are likely to prevail during 1920, it believes the allowance made is reasonable and fair. Nothing in the order, however, should be construed as committing the commission to a permanent policy of basing allowances on percentages of operating revenue or to the percentage used, for as a general matter the depreciation reserve should be based upon the cost of the property against which the reserve is established.

Commencing on Jan. 1, 1920, the company is also ordered to make a monthly charge to interest and a credit to not only its depreciation reserve but to all active reserves, partially or wholly built up through charges to operating expenses, amounting to $3\frac{1}{2}$ per cent interest on the several balances at the beginning of each month. The interest charge is treated as a deduction from gross income.

The company is also obliged to separate the depreciation reserve as between the single-fare and suburban areas, as well as to keep the monthly charges to operating expenses and interest separate as between the reserves, while losses on property retired from service are charged to the proper reserve.

Beginning Jan. 1, 1920, no additional charges are allowed to the reserves for "legal expenses" or "promotion of business." All such expenditures shall be charged directly to operating expenses, except as the company can continue its present practice of charging a part of legal expenses to capital expenditure.

The cost of stock handling, now carried in a separate account, is to be charged after Jan. 1, 1920, to a "materials and supplies disbursement reserve," and a percentage added to materials issued to cover the cost of handling and storage plus losses due to breakage and spoilage after deducting therefrom the interest credits to this reserve.

Until such time as a scientific computation of relief and pension requirements can be made, based upon an actuarial study of pensions accrued yearly, all charges shall be made on the basis outlined in the commission's audit for the three months ended July 31, 1919.

All interest credited to reserves or charged to interest paid, under deductions from income, is segregated from interest paid on funded and floating indebtedness and entered in a lump on the income account under a new caption "interest on reserve capital."

Changes are also made in method of computing and distributing taxes. The commission ordered that all State, city and capital stock taxes be apportioned monthly among the several operating utilities and the power division on the basis of the fair value of the property as of Jan. 1, 1920, until the completion of the property ledger. Federal income taxes are also to be apportioned monthly upon the basis of the distribution of the net income of the preceding calendar year among the several operating utilities.

The company must go back to the forms of monthly reports made prior to the consolidation of last February and again make two separate railway monthly reports—one report covering the operations of the Milwaukee city railway and the other the operations of the suburban, inter-urban and Racine railways. The same is required of the electric utility, and to preserve the continuity of records the company must prepare corresponding reports covering the results of operations from Feb. 1, 1919, to date.

The November, 1919, and subsequent reports must show condensed statements of income accounts and the power costs computed in the manner specified and apportioned to the several utilities for the month.

Transfers on a transfer are also ordered in the central area, effective Nov. 24, 1919, subject to limitations from time to time, approved by the commission. The company is also instructed to take immediate steps to procure 100 additional cars having a seating capacity of 5000: plans for such cars to be submitted by Dec. 1, 1919, and to be in service not later than Nov. 1, 1920.

The report of the Wisconsin Board of Conciliation (created under Chap. 530, Laws of 1919), filed with the Railroad Commission, was approved and the railway company ordered to make effective the wages, hours of labor, working conditions determined therein as being fair, equitable and just, and in compliance with Chap. 530 of the Laws of 1919, the rates of fare were ordered changed to cover the increased cost of operation.

Effective Nov. 2, 1919, the rates charged are: For any ride within the Milwaukee single-fare area, including transfers, a cash fare of 7-cents, and two tentative ticket rates, namely—six for 35 cents or eighteen for \$1. Both classes of tickets are sold on the cars. The eighteen tickets for \$1. which are in a convenient book or folder form are also sold

at the stations where the electric bills of the company are paid.

In the suburban area the fare was fixed at 3 cents per zone, with a 6-cent minimum. In all other respects the July 2, 1918, decision covering fares on the suburban lines remains in effect.

During the morning and evening rush hours the same fares as prevail in the central area are to be effective on special cars or trains between Cudahy depot and Mitchell Street. The company under the terms of the order is also required to submit prior to Nov. 15, 1919, a scheme for the issuance of commutation tickets between South Milwaukee and the single-fare area.

The commission attached to its order an addendum con-

cerning the advisability of establishing an automatic cost basis of fares within the single-fare and suburban area of the city of Milwaukee.

Regarding this the commission said that it was inclined to believe that with the accounting practices established, no great difficulty would be met in providing by order for a more or less automatic adjustment of fares. The working out of this order and the results of some experience will undoubtedly be helpful in working out a basis for a possible order. This suggestion was made in the hope that it might lead to a larger consideration of the subject and its possible benefit, and with a distinct assurance that if it shall appear to those interested to be feasible, the commission will be glad to work along lines of making it effectual.

Municipal Ownership Conference

Meeting Continues Three Days in Chicago with Three Sessions Each Day—Resolution Indorses the Desirability of Public Operation of Utilities—Papers on San Francisco and Seattle Systems

A THREE-DAY conference was held, Nov. 15-17, at the Congress Hotel, Chicago, by the Public Ownership League of America. Some fifty other organizations were invited to participate in the conference. Among them were the local public ownership leagues in Chicago; Duluth, Mich.; St. Joseph, Mo.; Columbus, Ohio; Dubuque, Ia.; Paducah, Ky.; Fort Wayne, Ind.; and in the states of Kentucky and California; as well as several railway labor organizations. Altogether, forty-three papers were scheduled for the conference. Three sessions were held each day of the meeting, namely on Saturday, Sunday and Monday.

Four papers among those scheduled related primarily to electric railways. One of these was the address of the president, Albert M. Todd, who compared the results of municipal ownership in Great Britain with private ownership of utilities in the United States, to the disadvantage of the latter.

Delos F. Wilcox presented an address on "The Present Street Car Crisis in America and the Way Out," the way out being municipal ownership, which Dr. Wilcox said American cities have been very slow to adopt. Chicago, for instance, voted for immediate municipal ownership thirteen years ago, but has not got it yet. Detroit and Toledo have also been talking about it for a long time, but Toledo has not even got private operation now. Dr. Wilcox thought that the experience of the people in Toledo would teach them to stop pussyfooting. Referring to the progress of the municipal operation idea he said: "The result of the Railroad Administration and the campaign that has been carried on against public ownership, using the Railroad Administration as an illustration of the so-called or so-called inconveniences of public ownership, have made the business interests of the community as a whole more reactionary with respect to public ownership than they were before the war, while the underlying elements, the elements that are silent in ordinary times, are more radical." He suggested that the Seattle plan of purchase might be useful in other cities in working out the financial problem.

Mayor Thompson of Chicago was scheduled to present an address on "The People's Plan for Ownership and Operation of the Chicago Street Railway System." In his absence he was represented by Frank T. Ayers, who said that the Mayor's plan was for the railway lines to be operated by a street railway commission of five, elected by popular vote.

Abstracts of the papers on the San Francisco municipal system by M. M. O'Shaughnessy, city engineer of San Francisco, and on the Seattle municipal lines, by Thomas F. Murphine, superintendent of public utilities of Seattle, are published in abstract on pages 896 to 898 of this issue of the JOURNAL.

Before the close of the meeting the conference adopted a resolution in favor of public ownership of urban utility and transportation service, as follows:

RESOLUTION ADOPTED

Whereas, Adequate urban utility services (water, gas and electric supplies, transportation, etc.), are necessities of modern cities and are in their essentials service monopolies for any given city or metropolitan district, and which, as such, are eminently proper functions for governments to undertake and supply at low cost, and

Whereas, It has been the general practice to delegate these important service functions to private interests by charter and franchise grants with an almost universal resulting inadequacy and high cost of service, financial exploitation and the final break-down of the "System," also in view of the recent general demands made by the utilities companies for higher rates and the street railways and rapid transit interests for higher fares (which they have generally secured, regardless of contract obligations, even without proof of the justice or equity of their demands), usually to insure returns on fictitious values, overcapitalization, improvident financing and bad management, and

Whereas, The experience of over sixty years has shown that franchise trading for utility service undertakings and street railway and rapid transit grants and the selfish activity of these private interests for profit, have been the most active and potent factors in bribery, political corruption and prostitution of municipal governments in the country, and

Whereas, The cities of other lands, notably Great Britain and Germany, have found it expedient and to their best interests to eliminate private profit-making concerns, and to take over their urban utility and transportation service as municipal enterprises (the majority of American cities already own their water supply and some of the Pacific coast cities, San Francisco and Seattle, have undertaken public ownership of city transportation service), as the only definite and satisfactory solution of the municipal utility service problem, now therefore be it

Resolved, That we, the members of the Public Ownership League of America, in conference assembled, express our belief and devotion to the principle and practice of public ownership, and operation of the water, gas and electric service and urban transportation and marketing facilities of our cities, and that we pledge ourselves to work in every practicable way to bring this about; that we urge this upon all citizens in the interest of public welfare, political honesty and civic righteousness, the desirability, or rather the necessity, of taking over these func-

tions at the earliest possible date, and, eventually, all other essential services that are monopolies in their nature or scope, under public ownership.

Street Railway Situation in San Francisco*

Beginnings of the Municipal Line Described—City Now Has \$6,750,000 Invested—Company is Also Affected by High Cost

By M. M. O'SHAUGHNESSY

Engineer of San Francisco City

SINCE the beginning of street railway transportation San Francisco has been well to the front. It was here that the first cable car in the United States was operated, because of the fact that San Francisco is built on steep hills, making it almost impossible for the city to expand unless power-operated vehicles were employed, the grades being in some cases as steep as 21.3 per cent. Following the natural tendency to keep to the forefront in urban transportation matters, San Francisco also was the first in the United States to take up municipal ownership by the construction and operation of electric street railway lines.

The present mileage within the city consists of 360 single track miles of railway. Of this, 25 miles are operated by cable and 335 miles by electricity. The electric lines are all standard 4-ft. 8½-in. gage, the cable lines 3-ft. 6-in. gage. The 360 miles of road are operated by two companies and the municipality. The California Street Cable Railroad operates a little more than 10 miles of single track, using thirty-eight cars. The United Railroads operates approximately 286 miles of single track, and owns about 700 electric passenger cars. The municipality operates close to 64 miles of single-track line, owning and operating 195 electric passenger cars.

San Francisco has always been noted for the large number of passengers carried per car-mile operated. This is due to the fact that the street grades are so steep in places as to be unpleasant for walking. The natural arrangement of the city is also conducive to riding, as all of the business portion is located at the northeast corner of the peninsula upon which San Francisco is built. This means that all of the population going into the business district or leaving San Francisco for the eastern side of San Francisco Bay must go to one side of the city. This makes the average length of travel much greater than would be the case if the business district were at the geographic center.

GENESIS OF MUNICIPAL RAILWAY

Prior to the fire which destroyed a large part of San Francisco in April, 1906, plans had been prepared and funds secured for the acquisition by the city of the Geary Street, Park & Ocean Railway. All thought of taking up this work was banished by the disaster, the money which had been appropriated for the railway work being used for the reconstruction and rehabilitation of streets and buildings. The Geary Street Railway's franchise had expired in 1903 and the company had been operating on a temporary month-to-month permit, paying into the city's treasury 5 per cent of the gross revenue. On Dec. 30, 1909, at a bond election, a proposition was passed calling for the expenditure of more than \$2,000,000 for the construction of a little over 15 miles of single track overhead trolley electric railway over the old route of the Geary Street Railway, with extensions to the ocean on the west and the ferry on the east. This work was in part completed and placed in operation on Dec. 28, 1912; the remaining

portion being placed in service on June 24, 1913. This railway was very successful from the outset, bringing in almost \$500,000 in gross receipts the first year of its operation, with a passenger car revenue amounting to 34.19 cents per mile.

At the time this road was finished the city was compelled to plan for the traffic of the Panama-Pacific International Exposition. This exposition was to be held in a portion of the city which was not adequately served by street railways. The privately-owned roads declined to make the necessary extensions to serve the exposition. Plans were then made for greatly enlarging the Municipal Railway system and in August, 1913, a bond issue to the amount of \$3,500,000 was voted by the people for the primary purpose of serving the exposition needs. This bond issue was to construct some 25 miles of additional single track and to purchase 7.8 miles of single track of the existing Presidio & Ferries system and the work was carried out prior to the opening of the exposition.

In 1916 the matter of constructing a line on Market Street was again taken up. A great deal of opposition from the existing private corporation against building parallel outer tracks was encountered, resulting in the matter being carried to the Supreme Court of the United States. The city, however, after winning all of its contentions was able on June 1, 1918, to commence the operation of its cars along the full length of Market Street over new tracks built outside of those belonging to the United Railroads.

At the present time the city has approximately \$6,750,000 invested in its railway system, \$1,000,000 of which came from earnings. During the past year it operated more than 7,200,000 car-miles with net passenger receipts of nearly \$2,500,000, the revenue per car mile being a little more than 33½ cents. Almost 60,000,000 passengers were carried.

NET EARNINGS AFFECTED BY HIGHER COSTS

When the road was first placed in operation the conductors and motormen were paid on the basis of \$3 per day of eight hours. This was later increased to \$4, then to \$4.50, and beginning with July of this year the wage is \$5 for eight hours time. The wages paid by the United Railroads are lower, running from 46 to 52 cents per hour, but the men may work more than eight hours per day and every day in the month if they desire. Thus the average monthly pay of a man employed by the private corporation is greater than that of a man employed by the municipality where they are limited to eight hours per day and six days per week.

As indicated before, the passenger car revenue per car-mile in 1912 amounted to over 34 cents. For the past fiscal year this same revenue was but 33½ cents. During the same period the operating expenses have increased from 15.9 cents to more than 26 cents per car-mile. There has been no increase in the rate of fare, while the average length of ride per passenger has been very materially increased. Increased expenses of operation have been met out of net earnings. Beginning with July 1, 1919, when the last increase in wages was made, there will be no net income out of which to meet increasing costs or extensions with a continuation of the 5-cent fare. Heretofore it has been the custom to set aside 18 per cent of the gross passenger receipts to cover depreciation and to provide a fund out of which to pay damage claims. These funds are the only place it seems possible to secure the necessary money to meet the expenses. The percentage which has been set aside was very carefully determined at the time that we commenced operating the road. Other roads operating similar system are allocating to depreciation reserve about the same percentage of their passenger receipts. In order

* Abstract of paper presented at meeting of Public Ownership League of America, Chicago, Nov. 15-17, 1919.

to meet the July payroll a small amount has been borrowed from this fund, although as yet no definite action has been taken by the Board of Supervisors of San Francisco as to the final policy which will be pursued.

The privately-owned railway lines have not agitated for an increased rate of fare although the reports given out by the companies indicate that the companies did not meet their operating expenses and fixed charges during the past year, and they have not for a number of years paid dividends.

Because of a number of causes it is very undesirable upon the part of the corporations to increase their rate of fare. This is partially due to the competitive nature of the Municipal Railway and the privately-owned roads, and also because their franchises stipulate that the fare shall not exceed 5 cents. It is equally true that it is very undesirable for the city to raise the rate on the Municipal Railway, as it would immediately justify any claims the privately-owned lines might make for a similar fare, at the same time causing unfavorable comment from the opponents of municipal ownership.

Within the past two weeks* the transbay ferry lines have increased their cash fare rate to Oakland, Berkeley, and Alameda, from 11 cents to 15 cents, and the commutation rate from \$3.30 to \$4.00. The whole matter of street railway operation is being watched with considerable interest by all parties, but at the present time there is no surface indication of any change in street railway fares or operating methods. Taken on the whole, San Francisco, having 1 mile of single track for each 1600 inhabitants, is very well provided with railway service of a high class.

While not wishing to advocate the increase of street railway fares at this time, it is my opinion that the traveling public can only expect to get what it pays for and that in any community served with street railways it is much more desirable that the returns to the corporation or to the municipality be sufficiently high to insure first-class service rather than to retain a low fare and allow the service to deteriorate.

Seattle Municipal Lines†

More Service Given Than Under Private Operation—Control of Jitneys Important—City Has More Tracks Than Any Other Municipal Railway

BY THOMAS F. MURPHINE
Superintendent of Public Utilities

ON APRIL 1 of this year the city of Seattle by the purchase of the street railway properties of the Puget Sound Traction, Light & Power Company came into possession of approximately 206 miles of street railway track and overhead system, 540 street cars, eighty pieces of real estate and a variety of buildings, carhouses and shops, freight sheds, machinery, tools and equipment, and a stock of supplies.

Certain portions of this property were appraised by various engineers and real estate experts. The street cars were valued at \$2,500,000; the commercial real estate at \$540,000; the buildings, carhouses, shops and freight sheds at \$528,980; the machinery, tools and equipment at \$500,000; and the stock of supplies at \$350,000. The railway track and overhead system was not physically appraised at this time, but from former appraisals made by engineers of the Public Service Commission of the State of

Washington and by comparison with the cost of construction of like track by the City of Seattle and the City of San Francisco, a value of \$11,683,966 was placed on them by this department.

The total purchase price by the city of the street railway properties was \$15,000,000 in utility bonds, payable in annual installments of \$833,000 beginning March 1, 1922, with interest on the total amount of 5 per cent per annum, payable semi-annually.

REASONS FOR PURCHASE

The immediate causes that led up to the purchase by the City of Seattle of the railway properties of the private company were:

1. The service given by the company was totally inadequate.
2. The company was demanding an increase in fares of from 1 cent to 2 cents.
3. The company was further demanding to be relieved from all franchise obligations.
4. The employees of the private company were not being paid a living wage.

The city officials of Seattle maintained that with the relief from franchise obligations adequate service could be given and the fare kept at 5 cents.

The city has now operated its railway system for the first quarter of the year 1919 and a brief résumé of operating receipts and expenses for the first quarter with the comparison of the corresponding quarter of last year will be interesting. Our experience for the first three months, however, ought not to be taken as a basis for calculating future operations.

CHANGES SINCE MUNICIPAL OWNERSHIP

The operating economies proposed by the Department of Public Utilities have not, as yet, been put into effect for the reason that the physical connections between certain of the lines have not been completed; the skip-stop system has been installed on only four lines; downtown traffic is more congested than ever, the new traffic code having just been passed by the City Council; the campaign for the saving of power has been installed on only a few lines; and the thorough co-operation of the employees with the city has not, as yet, been fully effected.

However, under practically unchanged conditions the city immediately increased its service so that for the first quarter of its ownership it operated 4,146,850 car-miles as against 3,386,311 car-miles for the corresponding quarter of last year, showing that there has been an increase in service of 760,539, or a little more than three-quarters of a million car-miles, carrying a total of 33,015,082 passengers as against 28,394,008 total passengers for the corresponding quarter of last year.

The total revenue for the first quarter of this year was \$1,229,039 as against \$1,135,122 for the corresponding quarter of last year, and the total operating expense for the first quarter of this year was \$1,052,727, leaving a profit over operating expense of \$246,312. From this there has been set aside the sum of \$198,781 to pay the interest on all outstanding obligations. Also, there has been set aside \$20,000 more than has been paid out for accident claims, and approximately a like amount of \$20,000 more than has been paid out for industrial insurance, leaving a net profit for the first quarter of \$6,808.

The wages of trainmen and other employees were increased practically 20 per cent. The following schedule of wages paid motormen and conductors under city operation as compared with wages paid by the Puget Sound Traction, Light & Power Company show the increase that was paid to trainmen beginning April 1, 1919:

* The paper is dated Aug. 27, 1919.

† Abstract of paper presented at meeting of Public Ownership League of America, Chicago, Nov. 15-17, 1919.

	Company scale	City Scale
First six months of service.....	40 cents	53½ cents
Second six months.....	48 cents	56½ cents
Over one year	50 cents	59½ cents

It will be noted that no amount has been set aside for depreciation, for the reason, which this department deems sufficient, that there has been expended during this quarter for maintenance of way and equipment the sum of \$230,540 as against \$131,796 during the same period in 1918. Approximately \$100,000 more has been spent by the city in maintaining the track, overhead system and street cars for this quarter than was spent by the company for the corresponding quarter of last year.

The Traction Company set aside approximately \$25,000 per month to take care of depreciation and allowed the property to depreciate. We believe that spending this depreciation fund now on the tracks and equipment (at least until the same are restored to a normal condition) is wiser than allowing the fund to accumulate, because we are appreciating the value of the property instead of allowing it to depreciate.

We expect to show in the near future, upon the completion of certain work now under way, with the complete installation of the skip-stop system and with certain reroutings, a large gain per month over the first quarter—at least enough to take care of the further increase of wages to employees to meet the increased cost of living.

It must be remembered, however, at this time, that the railway is still maintaining the largest franchise obligation, from a financial standpoint, that the private company agreed to maintain, i. e., the care and maintenance of that portion of the street covered by the railway tracks. This, the department feels, is not a proper railway expense under city ownership and it is not being charged against the railway in San Francisco and other cities which own and operate street railway properties.

MEANS OF RELIEF DISCUSSED

The rise in wages and prices of material caused by the war affected all lines of business, but none more than the street railway business. Nothing is more certain in this field that the fact that the business can no longer bear the charges and burdens that it has borne in the past. This is evidenced by the number of street railway companies that have gone into the hands of receivers in all parts of this country; by the miles of track that have been actually abandoned and taken up, and by the applications for relief from franchise obligations that have been made almost universally to the appropriate authorities.

It is now generally admitted that it is impossible to pay out of a 5-cent fare all the things that have been paid out of it in previous years. About four standard methods have been tried or urged upon the street railways to meet the change in conditions, viz: (1), increase in fare; (2), relief from franchise obligations; (3), economies in operation; (4), public ownership.

No one of them alone will suffice. There must be a combination of at least three of them. The fourth method (public ownership) is not, taken alone, sufficient. It must be accompanied by Nos. 2 and 3.

The increase of fare has been tried almost universally and, while an increased fare brings increased revenue, it does not do so in proportion to the increase in fare, showing that a large percentage of the people, under an increased fare do not use street cars. The short-haul patron walks and the longer-haul patron rides only when necessity compels him to do so. This affects not only the railway but the manufacturer and the business man as well and is not compatible with the idea of service.

Relief from all franchise obligations is imperative, and under public ownership and management there can be no

just reason advanced why any portion of the nickel fare should be taken to pay other than legitimate railway expenses. In fact, if the city owes a duty in the way of transportation, and everyone admits that transportation is a vital element in urban life, then the street car patron should be placed on an equality with patrons of other conveyances. At present, the car rider's nickel or fare has to maintain not only the car track but, to a large extent, the track of the competitors of the car in the field of transportation.

If the automobile can render service equal to the electric railway car, at a less cost, the sooner any city is convinced of that fact and acts upon it the better. But before any city can intelligently choose between rival systems of transportation it must first place them on an equal competitive basis, removing handicaps and equalizing burdens.

There is no indication now that automobiles can fill the place occupied by the street railways. They can perhaps take the cream of the business away from the street railways, and where the railway systems are privately owned might drive them into bankruptcy. Under city operation, unregulated jitney competition, while it cannot bankrupt the city, can make its street railways unprofitable and result in placing a burden upon the taxpayers that they would not have if the the street car and the jitney were placed on an equal basis.

MORE MILEAGE THAN ANY OTHER MUNICIPAL ROAD

Seattle has been spoken of as having the largest publicly-owned street railway system in the world. This is only true in regard to mileage of tracks. The City of Seattle is now operating approximately 230 equivalent single-track-miles of street railway. The City of Glasgow, Scotland, operates less than 200 equivalent single-track-miles of street railway, while the City of San Francisco operates approximately 60 equivalent single-track-miles of street railway. The City of Glasgow, however, serves a population three times as large as Seattle and carries annually four times the number of passengers that the street railways of Seattle carry, while the City of San Francisco, with approximately one-quarter the mileage, carries one-half as many passengers.

Procedure in Formulating Safety Codes

THE United States Bureau of Standards has sent out a preliminary report on the subject of best methods of procedure in formulating industrial safety codes. Plans for future procedure were submitted some months ago to a large number associations, federal bureaus, state utility commissions and others, with the request that preferences be indicated. The result of the balloting has been that majority of those voting prefer the following plan: The preparation of safety codes and other standards by appropriate sponsor bodies, but under the auspices and procedure of the American Engineering Standards Committee as enlarged under a revised constitution. Of a total vote of eighty-five organizations, fifty-six indicated a willingness to join the American Engineering Standards Committee.

To consider this matter further, the Bureau has called a conference scheduled to be held in Washington on or about Dec. 8.

It is intended at that time to consider the procedure which should be followed in further work on safety codes and the co-operation that can be secured among the engineering societies, government department and other agencies that are actively concerned with safety work. Formal invitations to attend this conference were to be issued at about the date when the forms closed for this issue of the ELECTRIC RAILWAY JOURNAL.

Soldered Bonds for Track Bonding

The Use of Soldered Type Bonds Is Decreasing But There Are Many Places Where Their Use Is Found Most Convenient

By G. H. McKELWAY

Engineer of Distribution, Brooklyn Rapid Transit System

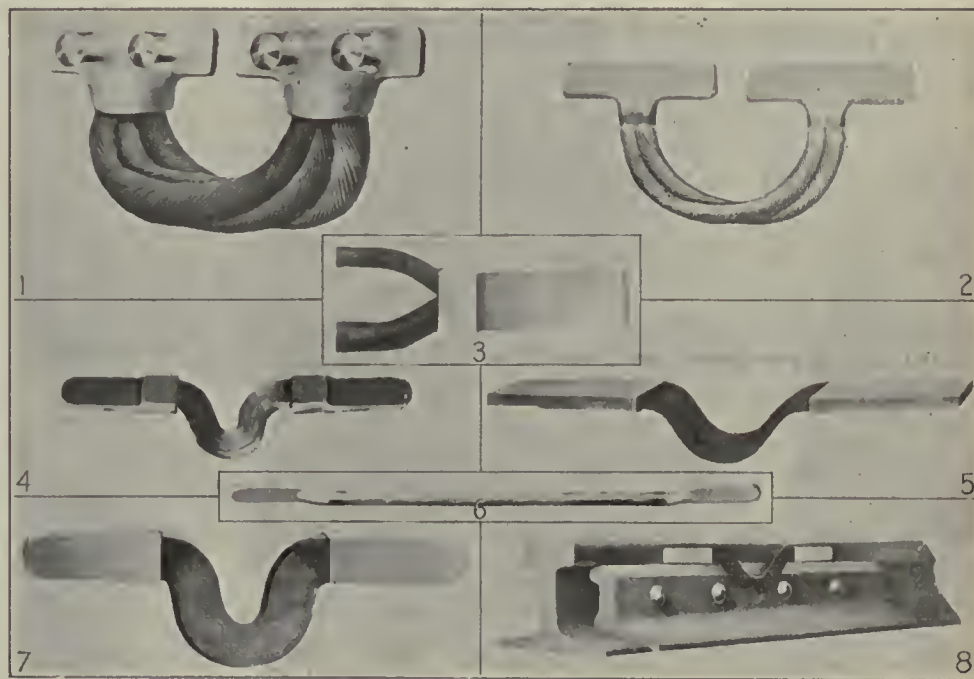
THE use of solder for attaching the terminals of bonds to the rails was much more common a few years ago than it is now, although it is still much used, but generally in rather special cases. About 1905 or 1906 the practice became quite universal and at that time many engineers predicted that the soldered bond would become the standard American type and would eventually supersede the other types. It was claimed that the large contact surfaces permitted a low current density and a low contact resistance; that there was not the opportunity for moisture to work in between two soldered surfaces and so to deteriorate the contact, as there is in the case of the joint between an expanded terminal bond and the rail; that the bond, if well installed in the first case, should maintain its excellence of contact indefinitely, and lastly, that the condition of the contact could always be ascertained by either measuring the electrical resistance or by attempting to pull the bond from the rail.

Other points in favor of the soldered bond were: that in most cases a shorter bond could be used than with any of the expanded terminal bonds then on the market, thus making a saving in first cost; that short bonds could be applied to the head of the rail and would be of so little value that it would not pay to steal them; that no holes would be drilled in the rail and so it would not be weakened by the installation of the bonds, and that no elaborate testing instrument would be necessary in making periodic tests to see whether or not the bond contacts were deteriorating, as the inspector need merely see that the terminals had not loosened from the rail and occasionally kick one to assure himself that the contact was still in good condition.

Soldered bonds are made in several forms and are applied to all parts of the rails, although the head is the place most frequently used. Two of the accompanying illustrations show bonds adapted for use on the head of the rail. Both consist of two soldered terminals connected by a short loop of copper wire or ribbon. In one case the loop is arranged to hang down vertically and in the other to stand out horizontally. Of the two types the former is more frequently used and is justly the more popular as it presents less surface to the blows of anything hanging from the cars which might strike the bonds and tear them off. It is not often that the brake rigging or other portions of the car equipment get down low enough to harm the bonds, but it takes only one such occurrence to

do wholesale damage to the bonds on long sections of track before the trouble is noticed and rectified. In order to avoid such damage the terminals of some bonds are made thinner at the top than at the bottom so as to cause the blows to glance off instead of striking them squarely.

Although in most cases the type of bond with the vertical loop is the one that should be chosen, yet the horizontal type must be used with rail joints of the Weber type which project out too far to permit of the vertical loop being bent across them.



TYPES OF SOLDERED BONDS

1—Soldered stud rail bond. 2—Tapered terminal bond for outer face of ball of rail. 3—Soldered terminal bond with two conductors of different size. 4—Bond with flat ribbon conductor. 5—Bond for underside of rail flange. 6—For bonding around splice bar. 7—Bond with thin copper strips for conductor. 8—Application of soldered bond to head of rail.

Of the two forms made with the vertical loop it will be found that the bonds made with wire conductors, if the size of the strands has been properly chosen, will generally outlast those having the terminals connected by ribbons, as the ribbons are much more sensitive to vibration and are therefore more easily broken.

There are two methods of inserting the wires into the terminals. In one they enter horizontally and in the other case vertically. The latter is to be preferred, as the bend in the wires at the entrance to the terminal which is necessary to bring them in horizontally, slightly weakens them.

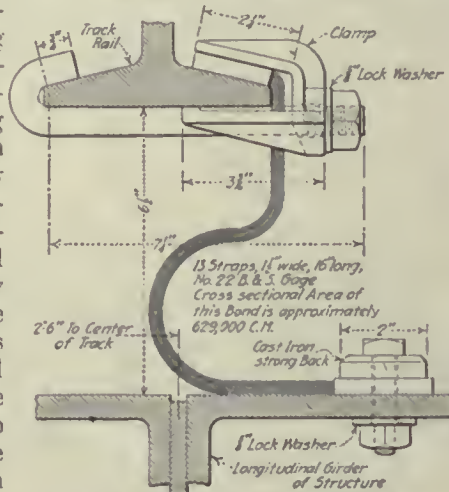
The same type of bond that is attached to the head of the rail and projects out horizontally from it is also suitable for use on the base of the rail. Where the rails are held together with fish plates without shoulders, which cover up the base of the rail, these bonds can be installed on the top of the base, the loop projecting up. The terminals can be installed between the fish plate and the

edge of the base. Such plates, however, are but seldom used now so that if these bonds are used as foot bonds they must be installed on the bottom surface of the base. This position makes possible the use of much broader bonds than when they are installed elsewhere but the bonds are hidden in the ballast and cannot be renewed or repaired without going to much trouble and expense. The result is that when such a bond fails another one is installed at another location on the rail instead of trying to do anything with the old one.

When installing such bonds on new rail the best way is to invert the rail and attach the bonds to long lengths of the rail, then set the latter up in place and spike it. Soldered foot bonds have given good service on third-rails but are hardly practicable for running rails, not only because of the difficulty of installing and repairing them but because they are liable to be damaged when the ballast is tamped around them or by the creeping of the rail. The terminals of other soldered terminal bonds are attached to the web of the rail and the conductors are run either under or around the joint plates in the same manner as is done with compressed terminal bonds, the only difference in the two types of bonds being in the form and manner of attachment of the terminals.

A number of years ago one of the electrified steam roads made quite a thorough test of short copper bonds, one end of which was soldered to the web of the rail and the other to the joint plate. It was thought that a saving in first cost would be shown with this form of bond as it required so little copper. However, two bonds were needed for each joint, one at each end of the plate, and the labor cost of applying the two bonds far exceeded the saving in the cost of copper. In addition, the short bonds soon failed owing to the relative movement between the joint plates and the rail.

All of the bonds so far described are attached to the rail in the same manner, that is, by sweating them on. The rails at the points where the bond terminals are to be applied are first cleaned and polished, preferably with an emery wheel, although filing or chipping will do. These points of the rail are heated with blow torches until they assume a violet or blue color which indicates a temperature of about 500 or 550 deg. Fahrenheit. Occasionally, the rail ends can be cleaned with a sand blast, which makes a first-class job, but it is very seldom that such equipment is available for use. After heating, the locations for the terminals are tinned by first brushing them with acid or other soldering flux and then by rubbing on a stick of solder. This is repeated until the points are well tinned and then the bonds are put in place and clamped there with "C" clamps. More heat is then applied from the torches and wire solder is run in behind and around the edges of the terminal. Probably the best work is done when the bond terminals are clamped only tightly enough to insure their staying in place and then are brought up as tightly as possible after the solder has a chance to penetrate between the terminal and the rail.



BONDING TRACK TO STRUCTURE

As the bond terminals are heavily tinned this will seem to be an unnecessary refinement to many, but it is a safer practice than that of setting the clamp up to its maximum tightness at first. Some of the terminals are knurled so that they will become imbedded slightly in the solder, and the chipping of the rail leads to similar results on the other side of the film of solder. One make of bond terminal is surrounded with wire mesh which serves not only to hold the copper ribbons together but also to act as a bond between the rail and the terminal by having its wires securely surrounded by the solder.

In order to be able to remove the clamp almost as soon as the soldering is completed, it has been the practice with some bonders to cool off the bonds with water, but the sudden shrinkage thus set up is liable to make the rail and the terminal pull apart and thus weaken the connection between them. It is safer to have plenty of clamps so that the work can go on and at the same time the bonds can cool slowly.

There are other soldered bonds which do not belong in the same class and which in fact do not belong to any single class as they are installed by first expanding the terminals in holes drilled in the rail and then by soldering them in place. The first of these bonds were brought out several years ago and were never widely used, although some companies made them standard and used them in large numbers. They were similar to ordinary compressed bonds except that the terminals were tinned. After being compressed into the rail the solder on the terminals was melted by heat generated by the ignition of a small charge of thermit placed around the end of the terminal.

In another type, designed to be used on and in the webs of the rails, two small terminals project out from the regular flat soldered terminal. These studs, which are also tinned, are compressed into holes drilled into the rail and soldered there, the heat being supplied from blow torches.

Still another type is practically a twin terminal bond for installation on the head of the rail, the terminals of this bond too being tinned. The studs of this bond are driven into holes in the rail head by the blows of a hammer and then the solder on the stud is melted by heat from a torch.

One class of work where soldered bonds have been used on a large proportion of the work is in the bonding of elevated structures or steel bridges so as to protect their members against electrolysis or to add the conductance of the steel in the structure to that in the rail. These bonds are nearly always made of flat copper laminations with the ends of the strips soldered together and also surrounded by a strip of copper soldered around the other strips. The places where the bonds are to be placed are first cleaned and then the bonds are soldered to them in the same manner as to track rails. The vibration of the bridges or other structures is very hard on the soldered connections so that sometimes the soldered contact is not relied on solely but is reinforced by either a clamp or a bolt. This reinforcement not only holds the surfaces closely together and reduces their movements relative to each other, thereby preserving the soldered connection, but, if the latter is broken, the mechanical connection prevents the bond from falling to the ground below and becoming lost. On the other hand, many men dislike the use of the bolted or clamped contact for the reason that there is no way of proving that the bonders have made a good job of the soldering as the bonds will stay in place even if no solder has been applied to their terminals.

Where both the rails and steel structure are bonded it is the custom to install "equalizer" bonds between them so that the current density will be approximately the same in both. These bonds are generally of the soldered

type, either with or without the bolt or clamp, and run from the base of the rail to the steel structure. These bonds are frequently installed only on every third length of rail as that is often enough even when heavy currents are taken by the trains. Where connections between the rail and the structure are made on sharp curves where the rail is worn rapidly away by the grinding of the car wheels, and so must be renewed at frequent intervals, it is much simpler to sweat the bond terminals off of the old rail and on to the new one than to renew expanded terminal bonds every time that the rails are changed.

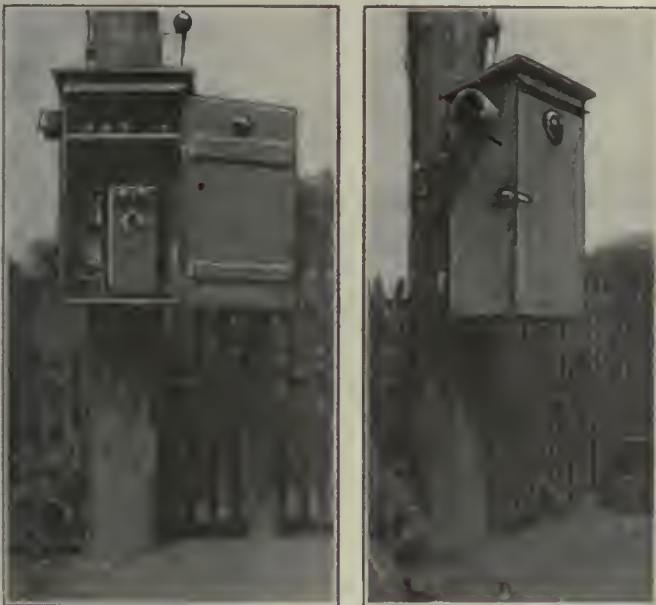
Manganese or other very hard rails are still often bonded with soldered bonds, but, with the exception of structure or equalizer bonds, the "plain soldered" bond has generally given away to some other type. It should be understood, however, that the "plain soldered" bond just referred to does not include the type where the bond is installed by expansion of the terminal as well as by soldering it to the rail.

Combined Signal and Telephone Box

For Communicating With Car Crew While en Route Dispatcher Causes Signal to Be Displayed in Box Which Contains Telephone

By HARRY RESTOFSKI
West Penn Railways, Connellsville, Pa.

IT FREQUENTLY is necessary for the Uniontown dispatcher of the West Penn Railways to communicate with a car crew while it is en route to the terminal of that line. As this terminal is near one of the car shops in the outskirts of the city, it has been customary for the dispatcher to call the car shop and ask a man to notify the conductor

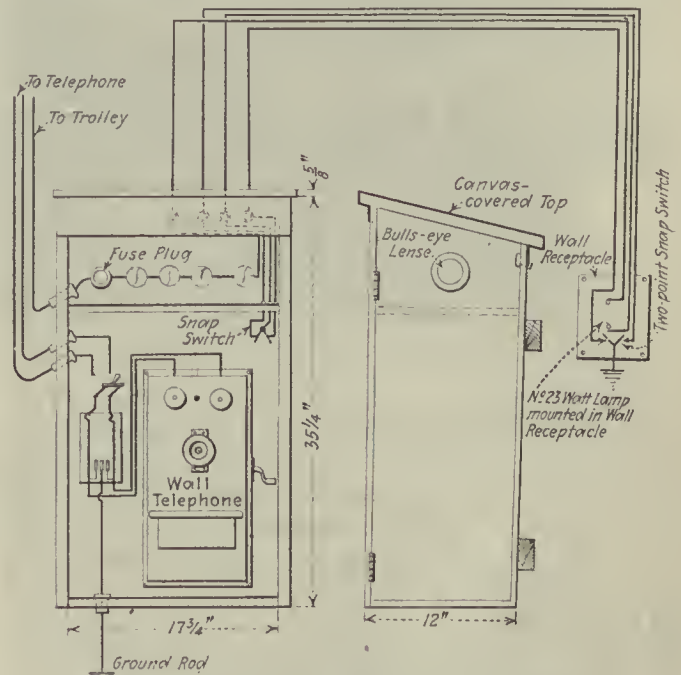


INTERIOR AND EXTERIOR VIEWS OF COMBINED TELEPHONE AND SIGNAL BOX.

to call up the dispatcher from the shop telephone as soon as he arrived. It frequently was inconvenient for a man to leave his work in the shop to perform this duty and it also caused a loss of time not only on the part of the shop men but of the crew as well. In order to meet this situation, R. S. Cooper, head of the signal department, designed the combined signal box and miniature telephone

booth with its circuits as shown in the accompanying illustration.

The box is built of wood and is located on a pole adjacent to the track in front of the car shop. It is provided with two compartments. In the upper one is a bank of four lamps, protected by a fuse plug, energized from the trolley wire. This lamp circuit is controlled by two two-point



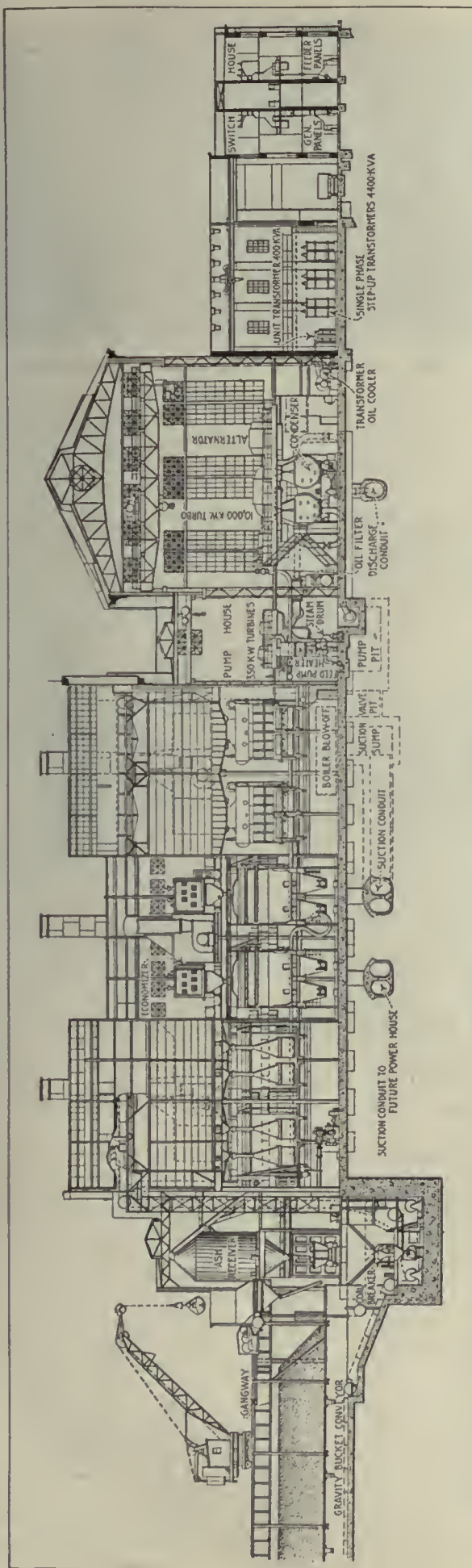
TELEPHONE AND SIGNAL CIRCUIT FOR SIGNAL BOX

switches, one located in the box and the other adjacent to the telephone in the carhouse. At each side and in front of this compartment red bull's-eye lenses are installed.

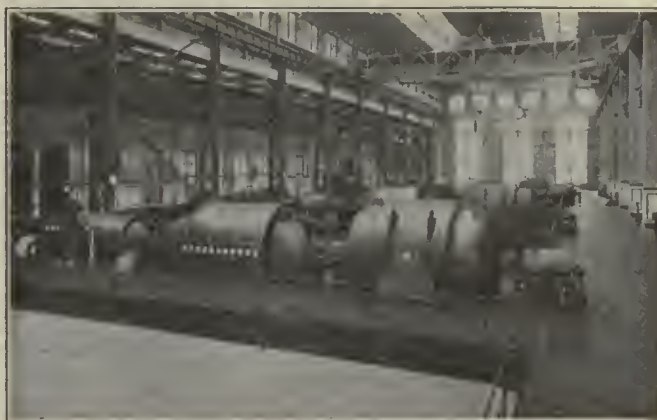
In the lower compartment of the box a wall telephone with protecting equipment is installed as well as a telephone switch and a two-point switch in the light circuit.

When the dispatcher desires to communicate with the crew he calls up the shop by telephone. The shop man who answers this call snaps his two-point switch and thus closes the circuit to the lamps in the signal box. A pilot light located just above the two-point switch in the carhouse, and connected with the lamps in the signal box, burns when the signal lights are lighted and thus provides an indication as to satisfactory operation. When the lamps are burning the bull's-eye lenses show red, and the signal crew is thus notified to stop and call up the dispatcher. The box is located at the end of a block so that a stop to operate the signals must always be made at this point. When the crew arrives the conductor connects his telephone, calls the dispatcher and when through turns out the lights by means of the two-point switch and disconnects the telephone from the line.

The Engineering Council, which represents the American Society of Civil Engineers, the American Institute of Mining and Metallurgical Engineers, the American Society of Mechanical Engineers, the American Institute of Electrical Engineers and the American Society for Testing Materials, has been elected to membership in the Chamber of Commerce of the United States. The council has appointed to represent it in the national chamber H. W. Buck, of Viele, Blackwell & Buck, consulting engineers, New York City, and as alternate I. E. Moulthrop, of the Edison Electric Illuminating Company of Boston.



LONGITUDINAL SECTION THROUGH NEWPORT POWER STATION

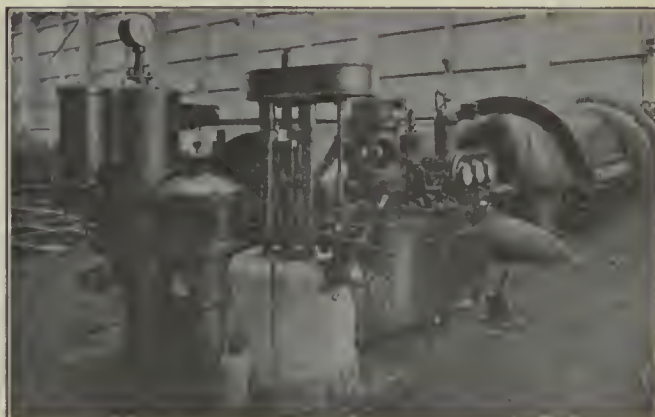


TURBINE ROOM IN NEWPORT POWER STATION

One of the more interesting features of the plant is the equipment for handling ash and coal. Coal is delivered to the plant in 15-ton bottom dump cars, which deliver their loads into four 50-ton track receiving hoppers, two opposite the end of each boiler room. The sidetracking is so arranged that after dumping their loads the cars can be returned to the main line by travel in a continuous direction without switching back. At present a steam locomotive is used for shifting cars in this service, but it is ultimately planned to electrify the sidings at the power plant and employ two electric locomotives.

From the receiving hoppers, the coal passes down through crushers, from whence it is discharged into bucket conveyors, three in number, of which the two outside ones carry the fuel to the two rows of overhead bunkers above each firing aisle. These overhead bunkers supply a capacity of 1500 tons for each boiler house, and the coal is discharged from them by gravity chutes direct into the boiler receiving hoppers.

A 10,000-ton coal storage area is also provided opposite each boiler house. For delivering coal to these storage areas, it is received in the same track hoppers mentioned before, from which the central bucket conveyor carries it up to a structure extending over the storage area from which it is dumped as required. This same conveyor continues to the end of the structure and passes down into a tunnel underneath the structure and returning at this level to the room underneath the main track receiving hopper. Coal can thus be taken from the storage pile underneath the structure by means of chutes which discharge by gravity onto this bucket conveyor and carried back to the power plant where it is dumped on the two conveyors leading up to the overhead bunkers. Or, as a duplicate system, the coal from the storage area may be picked up by a traveling crane and grab bucket which is mounted on the structure



STEAM END OF ONE OF THE 10,000-KW. TANDEM TURBO-GENERATOR UNITS

over the storage area, and discharged into an auxiliary hopper which in turn discharges into the main receiving hoppers. One of these traveling jib cranes and bucket conveyor systems is provided for each boiler room.

The ashes from each boiler fall from the stoker into a bunker in the basement, capable of storing an accumulation over some twelve hours of working at full load. A portable crusher for breaking up clinkers is operated on a narrow gage track below the ash bunkers and discharges into a pipe through which the ashes are conveyed by air suction to elevated ash receivers outside and at the end of the boiler houses. From here they are discharged by gravity into cars on the main coal siding.

The six steam turbines, of which four are installed at present, are of the Parsons pure reaction type with a single-flow high-pressure cylinder and double-flow low-pressure cylinder, and they operate at a speed of 1500 r.p.m. Two auxiliary turbines of 350-kw. capacity each, delivering 25-cycle three-phase current at 440 volts, are used mainly for starting up the condensing plant auxiliaries prior to getting the main turbines under way. When the latter are in operation, the 440-volt supply for all station auxiliaries is taken from main transformers or from a separate unit transformer provided for each main turbine generator unit.

DISTRIBUTION SYSTEM

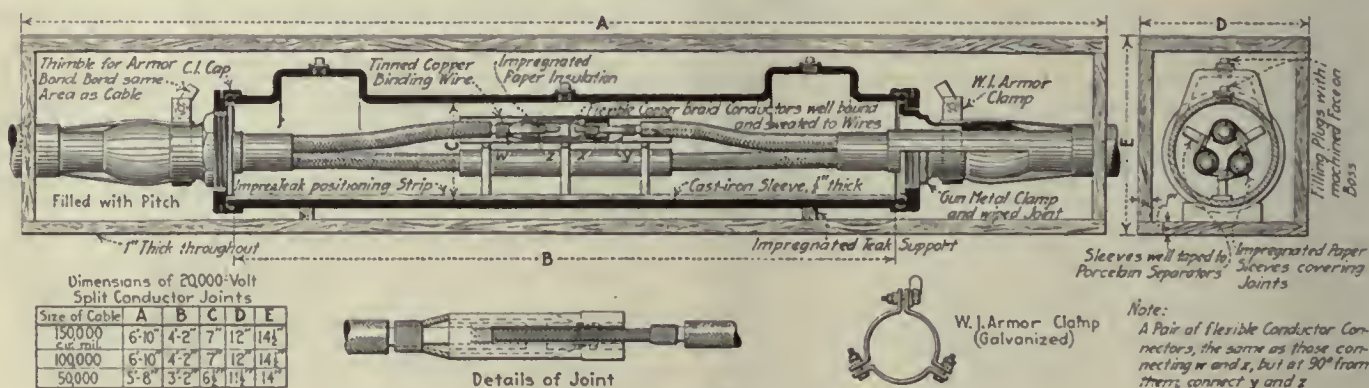
From the Newport power house thirteen 20,000-volt supply lines radiate to the fifteen railway substations. All



FIRING AISLE OF THE NEWPORT STATION BOILER ROOM

of-way. The trench averages 4 ft. deep, and the cables are laid at a distance between centers of 21 in. and are covered by red gum boards 9 in. wide and 1½ in. thick, laid about 4 in. above the cable. Joints in the cable are made in cast-iron boxes fitted with covers to provide for filling them with compound so that air pockets will be eliminated.

All of these supply lines to the various substations except that to the Albion substation are laid underground their entire length. Only the first mile of the line to the Albion substation is underground, and from this point, the two cables supplying this substation are connected to two over-



METHOD OF SPLICING 20,000-VOLT SPLIT CONDUCTOR CABLE

of these lines are of the split-conductor type of paper-insulated, lead-covered and wire-armored cable, having a protective serving of heavily compounded Hessian tapes between the lead and the armoring and again outside the armoring. They were furnished by the British Insulated & Helsby Cables, Ltd., of Prescott, England.

These cables are laid mainly in trenches in the streets owing to the very limited space available along the right-

head transmission lines carried on high steel masts of construction similar to those carrying the contact wires on electrified tracks. These masts will be so arranged that by the introduction of steel bridges between them, the track can be electrified and doubled if necessary.

SUBSTATION CONSTRUCTION AND EQUIPMENT.

The thirteen railway substations are variously equipped, some of them with temporary installations on account of the difficulty which was experienced in securing the specified machines. The installation in the various substations comprises from two to four 22,000/1500-volt rotary converters of 1500, 2250 or 3000-kw. capacity, and one substation has two 350-kw., 600-volt rotaries. Some of these were manufactured by the Siemens Brothers Dynamo Works, Ltd., of Stafford, England, and some by the General Electric Company, Schenectady.

The substation buildings are constructed of brick and stucco, with flat concrete roofs covered with malthoid. Each building comprises two or more rotary converter bays with an unloading bay, and, in the case of the central substations, a bay set apart for signaling equipment. An annex forms the switchhouse and operating gallery. Each rotary converter is installed in a separate compartment and during the starting up and operation of any particular rotary, the



FEEDER CONTROL SWITCHBOARD AND LIGHTING AND BATTERY CHARGING MOTOR-GENERATOR SET WITH DIRECT-COUPLED BOOSTER



TWIN CONDENSERS WITH AIR AND WATER EXTRACTION PUMPS

chamber is screened off and the locking gear on the entrance gate is interconnected with the 20,000-volt oil switch controlling the supply to the rotary converter transformers,

d.c. motor, so that if the a.c. supply fails the signal current will be maintained from storage batteries which are of 500-amp.-hr. capacity.

THE PERMANENT WAY

Normal permanent way construction consist of 100-lb. "T"-section rails double spiked to untreated ties of hard red gum, ironbark or boxwood, dimensioned 9 ft. x 10 in. x 5 in. and spaced 2 ft. 10 in. centers at intermediate ties and 8 ft. 8 in. centers at joints. The approximate depth of bluestone ballast is 15 in., of which 10 in. is under the ties. The track gage is 5 ft. 3 in. Tracks are centered 11 ft. 8 in. apart with provision for increase of this dimension. Minimum structure clearance above the platform level on tangent track is 7 ft. from the center of the track. This dimension is increased to 8 ft. on curves of 800-ft. radius. The minimum curve is on the Flinders Street (Melbourne) viaduct and this has a radius of 600 ft.

The line between Sandringham and Broadmeadows, which may be taken as typical of the system, contains a



STANDARD SIX-CAR TRAIN WITH THREE MOTOR CARS

and with the operating levers controlling the 1500-volt d.c. switch gear.

The switch house is three stories high. The ground floor is used for the installation of the cable terminal boxes, grounding switches, and potential transformers. The second floor is used for the oil-switch cells and current transformers, and the third floor for busbar chambers.

The operating gallery is also provided for on the second floor, and the 20,000-volt oil switches, 1500-volt d.c. switch gear and the 2200-volt signal supply switching are controlled from this point. The 15,000-volt d.c. positive busbar and switch gear is located underneath the operating gallery, and the negative and equalizer busbars are placed in the basement below the rotary converters.

The signaling bays are equipped with 65-kw. motor-generator sets for providing a supply of 2200-volt single-phase current from the 440-volt side of the three-phase auxiliary transformers to the signaling circuit. These motor-generators consist of a three-phase induction motor connected by slip coupling to a 2200-volt single-phase 25-cycle generator having the exciter on the same shaft. The generator shaft is also solid coupled to a 110-volt

maximum grade of 2 per cent. Between North Melbourne and Broadmeadows, a distance of approximately 9 miles, the average grade is 0.85 per cent. The maximum permissible speed on this section is 52 m.p.h., with restrictions on



CIRCULATING PUMP ROOM WITH VERTICAL SHAFT MOTORS MOUNTED AT THE FLOOR LEVEL

curves to suit a maximum track super elevation of 3 in. and restrictions at junction work to suit train operations. Practically all curves have a 150-ft. easement approach.

ROLLING STOCK EQUIPMENT

Electric locomotives are not used in connection with the electrification of the Melbourne suburban railways, but instead multiple-unit control motor cars. The practice followed is to operate the normal six-car train with a make-up consisting of a motor car with its controlled end outward at each end of the train, and with a third motor car placed about the center of the train. Thus about one-half of the cars have been equipped with motors, while a number of the trailers are equipped with control apparatus at one end. The balance of the cars are equipped with the necessary cables for multiple-unit control through any train, but without control apparatus.

The rolling stock for the electrical operation has been provided by equipping the old steam road coaches with new trucks and motors, and no new rolling stock has been purchased. Approximately 45 per cent of the electric rolling stock will consist of compartment cars with swing doors, the remainder being a combination type having sliding doors and cross-seats, with a corridor running the length of the passenger portion of the cars. The majority of the latter type of cars are partitioned off into sections to form smoking and non-smoking compartments. These cars seat from seventy to eight-four people.

The rolling stock equipment comprises 359 motor cars, fifty-six trailers equipped with control apparatus and 287 non-control trailers making a total of 702 cars equipped for electrical operation. Each motor car is equipped with four GE-237 motors rated at 140 hp. and normally a 750-volt machine. The two motors mounted on one truck are permanently connected in series and operate as one unit, either in series or in parallel with the two motors of the second truck. Among other equipment placed on the motor cars are the pantograph, dynamotor control apparatus and air compressor for Westinghouse brakes.

The weight of the motor cars completely equipped is from 105,000 to 107,000 lb., depending on the type of car, and the weight of the trailers equipped with the control apparatus is from 58,000 to 62,000 lb. The weight of the trailers not equipped with controllers is from 57,000 to 61,000 lb.

The car bodies are of combination construction, having a steel underframe and bulkhead and the remainder of the body framing of Australian wood or teak. Steel is also used for the exterior and interior panels, and for the head-lining. Electric lights have been installed in all cars by modifying the existing Pintsch gas fittings, two of which are provided in each compartment with total of 80 cp.

The motor trucks used are equipped with four 42-in. wheels, and arranged for inside suspension of the motors. The axles are 6 in. in diameter, and the journals are 9 in. x 5 in. The brakes are of the clasp type acting on both sides of the wheel.

A second installment of this article dealing with the overhead construction which embodies many unusual and unique features will appear in a later issue of *ELECTRIC RAILWAY JOURNAL*.

In testimony of the effectiveness of the efforts work of its employees interested in the safety campaign, the Ford Motor Company states that with a 26-per cent increase in number of employees between October, 1916, and May, 1919, there has been an 80-per cent decrease in lost-time accidents. For the year ending July 31, 1919, the plant had only one accidental death, a remarkable record for an average of 50,000 employees.

Removing Track with a Small Force of Laborers

By A. G. DRURY

Cincinnati, Ohio

A PUBLIC utility having failed to agree with the municipality in regard to the renewal of a franchise which had expired, permitting operation over two streets, was required by the city to remove its tracks from these streets. There was about 3000 ft. of double track on each street, making a total of 12,000 ft. of single track.

The line on one of these streets paralleled a line one square distant on which the company had a franchise, with the result that in this case the two lines owned by the same company were essentially competing against each other. The company was glad to be relieved of this operation with attendant cost of upkeep, renewals and repairs, to say nothing of the repaving of parts of the street.

On the other street, the situation was different. Certain parts of the line were more than a quarter of a mile from the nearest car line, which meant some loss of patronage. However, the tracks had to come up.

The removal of the tracks on the first street was accomplished in the regular method. The joints of the rails were removed and the single lengths of rail were loaded on a flat car by sliding them by hand up an incline of short skids on to the car.

By the time the company was ready to take up the rails on the second street a distinct shortage of labor had developed, and that which remained was not so efficient as the former gang. In fact, the company did not have enough men to load the rail in the old way, making even what might be termed poor progress.

The track on this street was of 70-lb. rail in 30-ft. lengths. The conductor on the car which hauled the flat car devised a way for loading the rail which worked out very well in this case.

The storage yard to which the scrap rail was hauled was on another line beyond the south end of the street under discussion. The gang therefore began at the north end of the street and would free first the right hand rail, then the left, from the ties and street in strips of seven rail lengths—that is with about 210 ft. of rail jointed together, the joint between the seventh and eighth rail being broken. The rail was freed from the ties and street by ordinary hand jacks, being placed in holes dug about 20 ft. apart under the rail and forcing it up, the wood ties being knocked from the rail with sledge hammers, and cross-roads of iron being cut.

When a 210-ft. strip of each rail was thus freed from the street, the south end of the strip was fastened to the flat car by means of a chain, and the car would then drag it back on to the untouched part of the street. There it would be separated into its 30-ft. lengths by removing the intervening joints.

To load it on to the flat car, the men would lift the end of the rail on to the end of the flat car which would then be started in the direction of the rail, i. e., north, thus forcing the rail to slide up on the car. Two men on the car and the remainder in the street would control the direction of the rail so that it would not slide off the car.

When two such strips, or fourteen rail lengths were thus loaded, the car would haul them to the storage yard where three men would unload them by sliding them off on skids, the piling up of the rail being left for another time.

When the cost of the job was figured up, this method showed only a slight saving in cost of removing track over the old method, but it did demonstrate that track could be removed with a much smaller gang of men than was usually employed for the work, which was a very important consideration at that time.

Correspondence on Washington Testimony

Letters from Messrs. Stotesbury, Mitten and Joyce with a Memorandum from Mr. Warner, Relating to Testimony Before the Federal Electric Railways Commission, Are Published

THE following correspondence is published with the permission of the Philadelphia Rapid Transit Company and the North American Company.

LETTER FROM MR. STOTESBURY

Chestnut and Fifth Streets
Philadelphia, Nov. 7, 1919.

T. E. MITTEN, President,
Philadelphia Rapid Transit Company,
Dear Mr. Mitten:—

The "Memorandum Re Philadelphia Rapid Transit Company" which I sent you some days ago cannot be considered as being anonymous because it was presented to one of my business associates by Mr. R. L. Warner of the North American Company, 30 Broad Street, New York City.

I shall be glad if you will make such answer to the North American memorandum as will set our friends straight in the matter.

Yours very truly,
E. T. STOTESBURY.

The memorandum above referred to reads as follows:

"(1) The American Electric Railway Association has presented before the Federal Electric Railways Commission, appointed by President Wilson, the universal need of increased revenues for electric railways, if these are to continue in operation. The testimony presented by a large number of bankers and operators two months ago were given considerable publicity throughout the country and the need of relief was generally conceded in editorial comment.

"(2) There has been a decided change in the situation during the last two months, due to statements emanating from Philadelphia quoting Mr. T. E. Mitten as entirely satisfied with a 5-cent fare in that city. These statements were generally seized upon by the radical press throughout the country as condemning the electric railway case through the testimony of one of its own operators.

"(3) So widespread has been discussion on this subject, that Mr. Mitten was summoned to appear before the Federal Electric Railways Commission two weeks ago and explain the reason for such satisfaction with a 5-cent fare in Philadelphia. Mr. Mitten did not appear in person but sent a special assistant to testify in his behalf. The general conclusion adduced from this testimony was not only that the 5-cent fare was satisfactory to Mr. Mitten, but that the results achieved by the Philadelphia Rapid Transit Company were due entirely to good management and could be duplicated in almost any other city in the country. These further statements designed to convict the entire industry of gross inefficiency in handling its business, were likewise given widespread publicity throughout the country.

"(4) Sentiment disclosed at the convention last week of the American Electric Railway Association was one of universal condemnation of the harmful publicity put forth from Philadelphia, resulting in several instances in failure of negotiations with public authorities for relief and the suggested retirement of the railway executives because of the resulting crisis. All the results of months of effort in public education have been largely minimized.

"(5) The only reason that can be assigned to Mr. Mitten's action, is that local conditions require his present stand; the facts as adduced from the reports of the Philadelphia Rapid Transit Company did not disclose that this company is more advantageously situated than many others. Maintenance and reserve for renewals are being sacrificed to pay dividends. The Philadelphia Company set up 15 per cent of its operating revenues for these purposes in 1918. It spent practically all of this amount for maintenance and its maintenance expenses per mile of track and per car were less than the corresponding figures in Cleveland, St. Louis and Milwaukee, where we know that maintenance and renewals were not at normal due to the conditions produced by the war. A number of the state commissions have specified as reasonable 10 per cent of the operating revenues for depreciation reserve in addition to the amounts expended for maintenance. Some traction company mortgages require that at least 20 per cent of operating revenues be used or set aside for maintenance and depreciation and engineering testimony generally is to the effect that this

amount is the minimum if the property is to be maintained. The rising cost of wages and materials with stationary fares, has made 20 per cent inadequate. It is estimated that an average rate of fare of 6½ cents would be necessary for the Philadelphia Rapid Transit Company to provide for maintenance and depreciation in accordance with accepted standards and pay 5 per cent dividends on its capital stock.

"(6) An erroneous impression of the prosperity of the Philadelphia Rapid Transit Company is obtained from the statement that it has paid a 5 per cent dividend on its capital stock. The common stock of the company amounts to only \$30,000,000 and represents a very small portion of the total investment devoted to city transportation service. Philadelphia in addition to its 5-cent fare secures an additional charge of 3 cents for some of its transfers; the revenue from this source alone was nearly equal to the dividend paid last year.

"(7) Traffic conditions in Philadelphia are unusual; it is one of the few cities whose riding population increased during the war. The relative location of its industrial and residence districts enables cars to be loaded in both directions and its standards of loading are very far below the standards prescribed by public authorities for other cities. These traffic conditions, methods of accounting, and a large proportion of new cars, rather than superior management are responsible for the fact that the company has remained out of the receiver's hands.

"(8) The value for rate making purposes of the property of Philadelphia Rapid Transit Company is probably not less than \$120,000,000. Its gross operating revenues for the calendar year 1918 amounted to about \$31,000,000. Against this value and this gross, the Mitten management charged to depreciation account only \$320,000. This is only 0.27 per cent of value and 1.03 per cent of gross operating revenues. For example, these figures are to be compared with those of United Railways Company of St. Louis. With a value approximately \$60,000,000 and gross operating revenues about \$13,600,000, maintenance charge was approximately 15 per cent of gross operating revenues, amounting to say, \$2,040,000, and in addition thereto, charges to depreciation account amounts to \$1,360,000, that is to say, 2½ per cent of value and 10 per cent of gross operating revenues.

"(9) Had the Mitten management been equally conservative in regard to Philadelphia Rapid Transit Company, its charges to depreciation should have been over \$3,000,000, this would have not only wiped out his so-called 5 per cent dividend on \$30,000,000 stock, but would have resulted in a deficit of about \$1,200,000 after paying interest charges. Upon the basis of sound bookkeeping the Philadelphia Rapid Transit Company is not paying dividends earned but paying dividends in liquidation. The accrued liability for future replacements is not less than \$18,000,000. The liability shown on the balance sheet as of December 31, 1918, was about \$1,150,000.

"(10) In conclusion

"(a) The allegations that a 5-cent fare in Philadelphia is remunerative have delayed fare adjustments in many other cities and subjected invested capital to further jeopardy;

"(b) Philadelphia requires fare increases as do all other cities and the public is being fooled into believing that increases are not contemplated;

"(c) The property cannot be kept in a proper condition of repair and the corporation cannot be made solvent on the present rate of fare;

"(d) The accrued liability for future replacements is not less than \$18,000,000 or about \$17,000,000 more than is recorded on the books of account.

LETTER FROM MR. MITTEN

Philadelphia Rapid Transit Company

Philadelphia, Nov. 10, 1919.

Mr. E. T. STOTESBURY, Chairman, Board of Directors,
Philadelphia Rapid Transit Company.

The writer of the "Memorandum Re Philadelphia Rapid Transit Company" is evidently unfamiliar with both facts and figures so far as Philadelphia is concerned. The treatise is misleading and bristles with untruth and misrepresentation.

It was only after the Federal Electric Railways Commission had been in session two months and Chairman Elmquist became more insistent because of the fact that Philadelphia, in marked contrast to the experience of other street railway companies, had succeeded in continuing the 5-cent fare despite advancing costs, that I agreed to present

PHILADELPHIA'S ANSWER TO THE TRACTION QUESTION

Philadelphia's Plan is not offered as a cure-all for other cities. Every situation has its own peculiar difficulties to overcome, but in the light of this experience, it is plain duty to deny the thought that there is any cure for the present trouble excepting that which lies in honest dealing, efficient management, effective workers.

There are striking examples of that which follows dependence upon increased fares alone.

Efficiency in management and effectiveness in men must prevail, else other means of transportation will follow higher fares, street cars will be supplanted, and the industry destroyed.

Philadelphia's results under this management are contained in the report for the eight years ended Dec. 31, 1918. This report and the books from which it was derived were both subjected to the scrutiny of separate sets of able accountants representing the City of Philadelphia and the Public Service Commission of Pennsylvania. \$31,337,807.04 representing 15 per cent of gross earnings was, by agreement with the city, set aside for maintenance and renewals. This fact speaks for itself and cannot be now confused by figure-juggling separate items of expenditure or appropriation.

More than 15 per cent of our greatly increased earnings are now being set aside. This represents about \$10,000 per mile of used track per annum, which is in our opinion here adequate, and is far in excess of the average set aside by other street railway companies. In this connection it must be borne in mind that gross earnings here approximate \$60,000 per mile per annum and that while our heavier track and better designed cars represent a greater capital investment, their effective life is much above the average.

The physical condition—cash reserves, and earned but undistributed surplus of P. R. T., will today compare favorably with any similar system.

Transit matters at St. Louis and Milwaukee are not in such condition as to warrant the assumption that the North American Company has yet produced a Moses to lead the industry out of its wilderness.

The North American "slide-rule" method of computation, which can be made seemingly to override facts and show an undue depreciation of property, will fail to impress Philadelphians who are familiar with the greatly improved condition of P. R. T. since the incoming of this management in 1910. The production capacity of the entire transportation system has been so greatly developed, and so substantial a proportion of physical improvement has been here paid from earnings, that the fixed charges, which in 1910 required 45 per cent, are now satisfied with but 28 per cent of the gross earnings.

Representing accomplishment and present sound condition: The basic 5-cent fare has been retained. The average rate of 4.13 cents has been reduced to 3.98 cents—a saving to passengers of \$7,941,983.73 in the period.

Wages increased 151 per cent—average day's pay now \$5.51. Passengers carried per trainman increased 121 per cent. The riding habit has been increased 50 per cent. Accidents have been cut in half; the money saved from this item alone totaled \$5,392,054.51.

Earned net income \$8,079,698.23, of which but \$3,597,578.50 was declared in dividends to P. R. T. stockholders—the remaining \$4,482,119.73 remained undistributed in surplus account.

Increased effectiveness of men and management makes for economical expenditure and has, therefore, much to do with the results here secured, and also with the adequacy of the funds.

T. E. MITTEN, President.

NOTE: C. J. Joyce ably presented Philadelphia's answer at the Washington hearings. The contents of his accompanying report are significant.

LETTER OF MR. JOYCE

Philadelphia Rapid Transit Company

Philadelphia, Oct. 13, 1919.

MR. T. E. MITTEN, President.

Philadelphia Rapid Transit Company.

Report on Washington hearing of Federal Electric Railways Commission at which I acted as your representative follows:

The need of Philadelphia's testimony is shown by reference to the statement before the Federal Electric Railways Commission Aug. 15 by the Chairman of the Public Service Commission of Pennsylvania, Hon. Wm. D. B. Ainey:

Let me express in no unfriendly spirit of criticism my astonishment at the incertitude and confusion with respect to remedies which appear in the testimony of the railways and allied interests which have been presented to you.

In the Philadelphia testimony the 5-cent fare was in no instance advocated as universally sufficient. Following your instructions to accentuate the fact that Philadelphia's plan is not offered as a cure-all for other cities, I was careful to make this fact clear in my response to all questions bearing on the subject, and that I succeeded in so convincing my audience is evidenced by the following, taken from the report of the hearings contained in the issue of the Electric Railway Journal, under date October 11, 1919:

In his testimony the witness (your representative) emphasized the idea that the inference should not be drawn that the measures and practices adopted and followed in Philadelphia would have worked equally favorable results elsewhere.

The argument and brief of the Amalgamated Association of Street & Electric Railway Employees of America demanding union domination was forcefully presented, and was undisputed in the evidence prior to the introduction of Philadelphia's answer.

The spokesman for the Amalgamated Association attempted to show that the efficiency of trainmen has increased out of all proportion to the increase in wages, and their testimony and statements to that effect stand upon the records of the Commission entirely unanswered, save only for the evidence presented by the Philadelphia Rapid Transit Company which shows that in Detroit, the home of the Amalgamated Association, where the employees are fully organized, there was in 1919 an increase in wages of 113 per cent over 1910, while the production of the trainmen has increased only 30 per cent, and in Cleveland where the employees are also fully organized there was, during this period, an increase in wages of 110 per cent and an increase in the production of the trainmen of only 27 per cent. Philadelphia during the same period, by co-operative effort, increased wages 151 per cent co-incidentally increasing the production of trainmen 120 per cent.

Although a considerable portion of the time of the Commission was devoted to hearing testimony on so-called "service-at-cost" plans, all of which involved the valuation of the properties of the utilities, the fact remains that the only positive and constructive suggestion for the basis of such valuation, upon which the commission could, in its report, base a recommendation to the state and municipal authorities, was that which is contained in the statement presented by the Philadelphia Rapid Transit Company.

C. J. JOYCE,

Special Representative.

N. S. C. Forms Engineering Section

THE National Safety Council is organizing an engineering section for the purpose of bringing together the civil, mechanical, electrical, mining and chemical engineers in the council's membership, so that they may contribute more effectively toward the solution of the purely engineering problems so frequently encountered in safety work. Membership qualifications are parallel to those of the great national engineering societies, except that for the present associate membership is open to engineers having three years experience.

The functions of the engineering section are stated to be:

1. To help to meet the technical demands of the various industrial sections and furnish them technical information as desired.
2. To perform technical services for the council, on request of the executive committee, such as the development of standards or participation therein; the solution, by inquiry or through research, of special engineering problems arising in safety work; and helpful co-operation with the American Engineering Standards Committee, the national engineering societies, the Bureau of Standards, the casualty department of Underwriters' Laboratories, etc.
3. To conduct one or more meetings as a part of the Annual Safety Congress, at which engineering problems shall be discussed.
4. To conduct, if considered desirable, one or more additional sectional meetings during the year, or in different localities.
5. To carry on such other activities as will, in the opinion of the executive committee of the National Safety Council, promote the safety movement and the best interests of the council.

The electric railway to Hakone, Japan, a prominent pleasure resort, began operation on June 1. By means of this line the heart of the mountain district is brought within four hours from Tokyo.

Italian Car Design Experience

**'All Standee' Car Is Unpopular—Convertible Standing and Sitting Car Substituted—
American Prepayment Plan Successful in Rome**

A SHORT item in the Aug. 3, 1918, issue of *ELECTRIC RAILWAY JOURNAL* related the plan of the Roman Tramway & Omnibus Company of Rome, Italy, to try out seatless cars for a period of six months. Information is now at hand covering the experience with these cars, and it indicates that they have met with much criticism on the part of the traveling public, even to the point that it has left these cars severely alone.

The development has progressed from this standing only car to a new convertible arrangement, whereby longitudinal seats are folded up or down during the rush hours to make seatless cars. The idea behind this plan was that while rush hour passengers were glad to hang on to the car anywhere, and would readily assent to the necessity to hang on the straps or special supports provided in the cars, it did not seem fair to compel non-rush hour passengers to stand. The convertible car, it is reported, has already practically demonstrated its adaptability to varying traffic conditions. The Roman Tramway & Omnibus Company has been operating two-car trains consisting of one seatless car, and one provided with the regular cross seat arrangement. With this combination, it has been very noticeable that the "sitter" cars are always crowded, even on the platforms where no seats are provided, while the "all standee" cars are left empty up to the last minute of the peak. This does not happen in the convertible cars because the passengers know that the conductor will pull the seats out again, as soon as this is possible, and permit the passengers to travel comfortably. A similarly successful experience with the convertible arrangement has been had by the Milan Municipal Tramways.

LOOP PREPAYMENT CARS

After much suffering from over crowding, numerous accidents to passengers riding on the couplers, buffers, steps and fenders of the cars, and the consequent loss of fares, the Municipal Corporation Tramways of Rome decided about the first of this year to install a prepayment plan of fare collection in conjunction with closed vestibules and folding steps. None of the prepayment plans of the United States or Canada was thought to be readily adaptable either to the design of existing cars, or to the riding

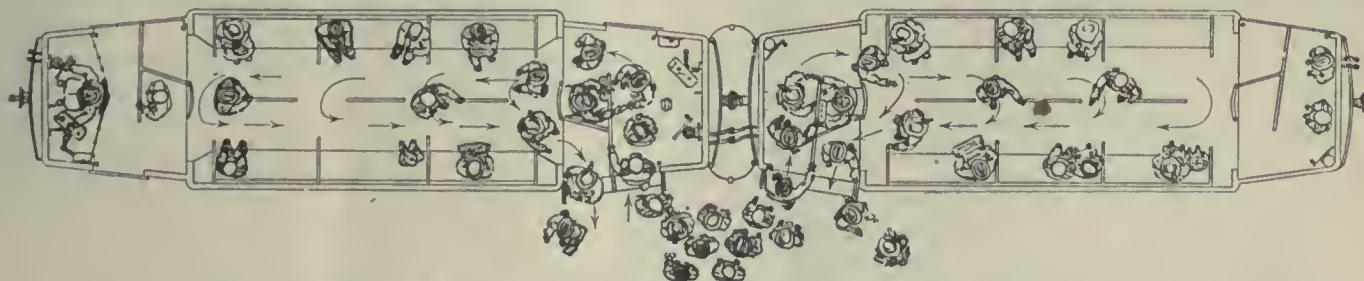


FOLDING SEATS, STANCHIONS AND RAILS IN LOOP PREPAYMENT MOTOR CAR

of leaving by the same door through which they had entered the car.

Based on these various considerations the "loop prepayment" plan was originated. This is illustrated in the accompanying drawing. Passengers enter at the dash side of the platform at the rear end of the motor car and front end of the trailer and leave by the corner post side of the same platform. This plan is claimed to eliminate any confusion, as the stream of entering passengers divides itself between the rear entrances of the two cars while the outgoing passengers leave at both sides of the entering stream without meeting or mingling with it. Moreover, the motor car conductor is enabled to supervise all loading and unloading operations of the train, even though the signal inter-locks should fail.

To carry out this plan, the vestibules of the cars were converted into payment platforms by the removal of the bulkheads. Inside the car body, the crosswise seats were removed, and folding longitudinal seats substituted, so that the cars may be converted during the rush hours into the standing only type. With the seats in service, there are

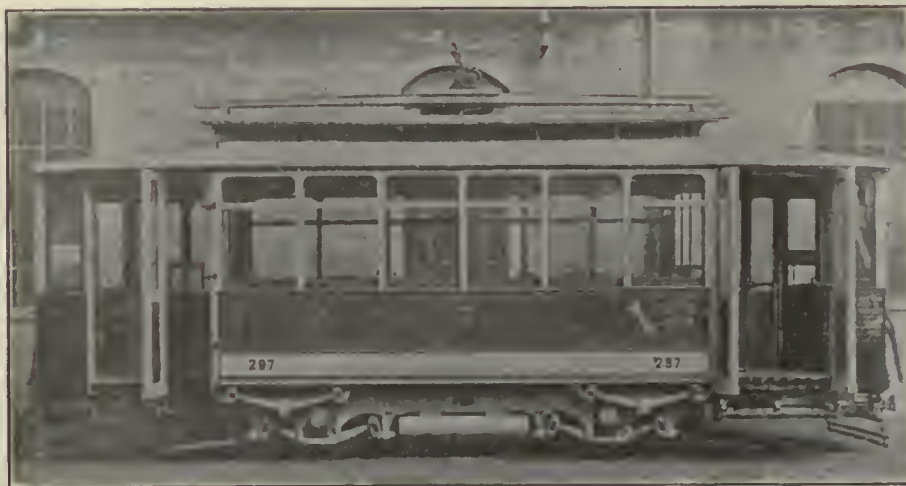


PATH OF PASSENGERS WITH THE LOOP PREPAYMENT ARRANGEMENT ON STANDARD TWO-CAR TRAINS

habits of the Roman public. Also, the almost universal use of trailers had a bearing on this consideration. So it was decided that both entrance and exit should be made on the same platform, as it had been found that the enter-at-rear, leave-at-front scheme which had been advocated and recommended by the management of both traction systems of the city for a number of years, had met with but scant respect from the riders. They always seemed desirous

seats for 18 passengers and standing room for from 20 to 25. With the seats folded down each car can accommodate as many as 70 riders. These figures apply both to the motor cars and to the trailers.

Each platform of the motor car is equipped with double doorways on one side and a single doorway on the opposite side. The double doorway is used at the rear of the car for the main ingress and egress of passengers. The single



ABOVE, LOOP PREPAYMENT MOTOR CAR SHOWING FOLDING DOORS AND STEPS AT THE FRONT AND REAR. AT RIGHT, ENTRANCE AND EXIT AT THE DOUBLE DOORWAY, AND POSITION OF CONDUCTOR ON THE PLATFORM

doorway is used at the front end of the car to permit the motorman to leave and enter the car without the necessity to go through it. This door is also conveniently used by the traffic inspectors, ticket takers and other employees. The trailer platforms are equipped with double doors on one side only. All doors are manually operated, the double doors by the conductors and the single doors by the motorman.

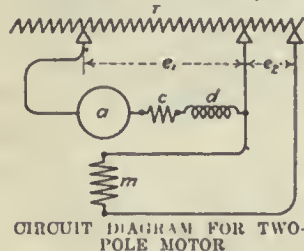
BIRNEY CARS NOW UNDER CONSIDERATION

The latest development in the Italian situation is the consideration looking toward the use of one-man safety cars. Data on the Birney cars are now being sought in this country by the Milan Municipal Tramways, and meantime a car is being converted along the lines of the American safety car as a step in blazing the way for the finished product.

Regenerative Braking with Single-Phase Commutator Motors

Tests Carried Out with One of Four Trial Locomotives Ordered by Swiss Federal Railways for St. Gotthard Line

IN THE ARTICLE describing the single-phase locomotives for the Swiss Federal Railways published in the issue of the *ELECTRIC RAILWAY JOURNAL* for June 14, 1919, page 1141, mention was made of the requirements of the railway authorities that these locomotives be provided with electric braking of some improved form so that power could be returned to the line. A test of this electric braking feature was carried on June 27, 1919, with the second of the four trial locomotives, which was built by the Oerlikon Company in conjunction with the Winterthur



Locomotive & Machine Works. This locomotive has been in regular service since the beginning of last May on the newly electrified Berne-Thun section.

Trials were first made with the locomotives alone on the steep gradient between Kandersteg and Frutigen. Additional tests were later made with a train weighing 345 tons (2000 lb.) traveling at different speeds up to approxi-

mately 43½ m.p.h.

These tests were conducted without the use of any mechanical brakes or brake resistances. The preliminary tests have proved entirely satisfactory, and the regulation at all speeds is reported to have proved very reliable.

The essential connections for regenerative braking used on this locomotive are shown in the accompanying diagram, which represents the circuit of a two-pole motor or generator with a rotor, *a*, and field windings, *m*. The various possible compensating or auxiliary-pole windings are represented by *c*. The armature is connected in series with a choking coil, *d*, of suitable dimensions, and connected with adjustable pressure steps, *e*₁, to a current transformer, *t*. Pole windings are connected to another suitably chosen pressure step, *e*₂, on the same transformer. The machine acts in conjunction with the reactance as a motor or generator, from rest up to high speeds, with a constant torque at the given pressures *e*₁ and *e*₂ and a power which increases proportionately with the speed. For a given terminal pressure, the current is said to rise from the lower limit value while stationary more quickly than the speed, and the power factor approaches unity.

In an article in the *Electrician*, London, for Dec. 20, 1918, Dr. H. Behn-Eschenburg gave a brief theoretical discussion of the principles of the control and makes some general statements regarding the arrangement and operation of the equipment. He states that as far as the properties of the motor are concerned, the new arrangement does not appear to offer any advantage, as the weight is generally greater for the same capacity and the power factor lower than in an ordinary series motor. The weight and cost of the choking coil, as well as the losses within it, are also additional. The advantage of the arrangement, however, lies in its simplicity, as only the choking coil is needed in addition to the usual apparatus for the control of the motors.

A note in a recent issue of *Engineering*, London, states that the Shanghai (China) Tramways has decided to build its own street cars. The company has acquired an acre of land, on which it will erect a new factory building and install the required machinery. The company proposes to begin its building operations with the construction of fifteen cars for use on rails and seven cars for railless operation.

Economics and Equity in Valuation

A Discussion of Eight Forces Which Interlock with the Process of Fair Valuation, with Brief Reference to Points of Application and Practical Working Methods

By CHARLES B. COOKE, JR.

Of Kelly, Cooke & Company, Engineers, Philadelphia, and assistant manager Transportation and Housing Division,
U. S. S. B. Emergency Fleet Corporation in Charge of Street Railway Operations.

GENERAL principles to be regarded in the valuation of street railway properties have been extensively and ably discussed, particularly during the past few years, in which the broad question has come to a head under stress of the receding investment status of street railways generally. The important factors, of which due and equitable account must be taken in the development of "fair values," of both physical and intangible property, are generally well appreciated in informed quarters and have recently been summarized in the comprehensive report of the committee on valuation, appointed by the American Electric Railway Association.

On account of the vital importance of the complex problem presented by determination of "fair value," which is a term more easily used than understood in its fundamental aspects, it is desirable at this time to give some additional emphasis to the play of what may be termed the economic levers operating between "value" and the general policy of the regulatory power with respect to limitation of public utility earnings. There are, without question, very direct controlling forces or factors of absolute natural jurisdiction at work in the premises, which may not be disregarded. The following commentary indicates broadly the nature of these:

1. *Origin of Limited Earnings Idea:* The idea of limited earnings has its origin in consideration of the public service business as a natural monopoly and as therefore enjoying a species of public protection for which the company should pay by a restriction of its earning power. Inasmuch as the benefits from monopoly are distributed to the public in the form of better and economically cheaper service, and to the company in the form of such profits as it may earn up to a given amount, without compensating guarantee as to minimum profits, the equity of such a proposition is open to serious question. It is evident that the major protection afforded by the monopoly principle is that received by the public in safeguarding itself from the disjointed service and inevitable higher levels of service charges which would obtain under competitive conditions. In the nature of the case, there can be no limitation of benefits to the public, and these do actually increase from year to year as the service monopoly expands its facilities. The equity here is unbalanced and must in time tend to create an unhealthful condition for the utility, the effect of which will be borne finally by its public either in the shape of higher fares, or the more costly alternative of deficient service.

2. *Differential between Value and Investment:* Commercial and economic definitions of value are multitudinous and, of necessity, relative in character. Viewed as a general proposition, it would appear that definition or measurement of value of capital after investment in public utility must be such as will co-ordinate with definition or measurement of its value after investment in industrial or other enterprises, in order that there may be no hurtful discrimination between competitive fields of investment. Any mature consideration of "value" of a public service property and of the underlying economic forces governing flow of capital into selected applications must lead logically to

the conclusion that cash capital devoted to public service represents but one element of its value after investment. Value may obviously be either greater or less than investment. In the case of a well managed property giving adequate service, it cannot be otherwise than greater. In a property giving poor service, value for rate fixing purposes will be equal to or less than investment if the inadequacy arise from bad management, but it will be greater if the poor service is a result of low earnings due to deficient rates.

Pretensions that original cash cost of existing physical property constitutes the only value on which earnings should be allowed emanate from a form of special pleading which would encourage the belief that a dollar invested to carry a man to work earns, and should receive, different treatment than accorded the dollar invested to put clothes on his back or food in his stomach. Man-made laws may authorize labelling the value and limiting the earnings of that dollar in the one case and not in the others, but none have yet been conceived that can control where the dollar chooses to work.

3. *Natural vs. Artificial Limitation of Earnings:* It would appear that the same economic law which governs the supply of other human needs and receipts therefrom will operate even more positively as an automatic governor of utility earnings. The law of diminishing returns will set in more surely following a rise in utility rates, regardless of whether such rise is justified, than it will following increases in commodity prices. Thus, the public utility is subject to the two-fold burden of an artificial and a natural limitation of earning power. The artificial limitation is, in the last analysis, needless, as it attempts to do something which would come about ultimately through natural causes, unassisted by fallible human dictation. And in the process of its operation, the artificial limitation works injury to the enterprise affected by automatically causing its withdrawal from attractively profitable classes of investment projects and limiting the grade of its product. The artificial regulatory power may only act with certainty and popular approval in depressing earnings. It cannot, with any similar certainty, elevate earning power by merely authorizing tariff increases, for in this domain the superior law of natural regulation will function, and from this the public service company cannot escape.

Human intelligence has not yet progressed to a point where it may embark safely on a policy which looks toward guiding or confining laws of natural economic forces governing capital distribution so that these will operate to produce certain specific results in a given field of application, without compensating effect therein and in other fields. The imponderable elements here encountered are too elusive and the whole structure of economic law is too complex and fluid in character to permit of manipulation of individual parts, with the assurance that the local effect obtained does not produce, in some degree, damage to the rest of the structure.

4. *Effect of Limited Earnings, Value Adjustment and Risk on Supply and Cost of Capital:* Limitation of earn-

ings may be dictated by all conceivable economic reasons, logical and sound from every academic standpoint, but if the man with money to invest does not like it and diverts his capital to other channels, then that policy applied to the public utility must be fundamentally defective, and it must only be a question of time before injurious effects accumulating from deficient capital resources are felt by both company and public.

Business risk in public utility operations cannot be regulated out of the mind of the investor. The risk is really there (witness railway conditions today), and private capital has the initiative to take it, but naturally and only if there be acceptable compensation in prospect. Capital has always refused to be bound by the judgment of a third party in the matter of what constitutes acceptable compensation for placing itself at risk. It is a poor rule that does not work both ways. Clearly, those who are responsible for an economically unsound utility enterprise should pocket its losses, but it is equally clear that responsibility for well conceived projects is entitled to rewards such as it may earn through increased use of facilities provided and effected through good management and service.

If, because it cannot be justified in a manner acceptable to the regulatory power, property value for rate fixing purposes be depressed, consciously or unconsciously, below a critical point, to an extent which prejudices its interests in the mind of the prospective or actual investor therein, the logical result will be a rise in cost of capital for that property or depreciation of its securities until a compensating balance is reached from the investor's viewpoint. He is the court of last appeal. This follows, not so much from the numerical amount of the value depression, as from the psychological effect on the investor, produced by the exercise of what he considers an arbitrary power which may finally affect his interest.

5. Value of Property to Community: Any consideration of fair value of the public service property must necessarily give due weight to value from the standpoint of its service to the community. In the commercial sales transaction, the price of the thing sold is governed largely by the question of its value to the purchaser, and if that value is not large enough to justify manufacture by those who are willing to assume its risk, the enterprise is not economically or commercially sound. The same principle holds good as to the sale of service by the public utility and should be accordingly recognized. If that service be adequate, the value of the property which provides it should be considered at least as not subject to the chance of depression to an extent which may work injury upon it.

It follows logically from this and for other sound reasons that depreciation which has set in on physical property is not a factor to be applied in fixing value for rate making. Value of the property and of its service to the public is not affected by the fact that the rail head may be worn half way through its useful life, so long as the wearing does not affect service. The public is, however, vitally concerned in guaranteeing itself the renewal of that rail at the appointed time and in seeing the company maintained in funds sufficient to provide therefor, and for proper maintenance in the meanwhile.

6. Other Regulation: The policy of supervision, or regulation by public bodies, of principles to be regarded in new and reorganizing financial operations is sound and well conceived, in that it tends to prevent recurrence of unsound practices marking the developmental period of some properties. Likewise, and for similar reason, the practice to be followed in capital, expense and revenue accounting is properly subject to guide and action of the regulatory power. Sound procedure in this domain must necessarily be one of the pillars maintaining the future value of the property to the community it serves.

Supervision and control of service and service facilities as to character and their adequacy to the demand is obviously essential and desirable, in view of its vital bearing on public and community interest. Regulation of financial and accounting practice is justified in that service, the vital thing, is thus insured and safeguarded and "value" thereby protected. Service is not so insured or safeguarded by the policy of regulated earnings, and hence value of the service property remains unprotected and is subject to depreciation through the very application of this policy.

7. Selection of Price Levels: One of the most difficult questions connected with the development of unit costs concerns the selection of the scale or level of basic material prices and labor rates, upon which to build up the structure of unit and total values. In the past periods of normal price fluctuations, it was common practice to base figures on prices representing three and five year averages, this being considered as a fair measure of the then probable future price levels. This was essentially sound, as findings for rate adjustments applying during a future period must necessarily be based upon probable firm value of property during that period. Under pre-war conditions of moderate variations, plus or minus from normal levels, past average prices could be safely considered as an index of the level of future prices.

Well appreciated conditions brought about by the war have, however, upset the logic and workableness of this basis for establishing fair values for the future period. This question may not now be considered apart from the high levels of operating labor and material costs. These are the reflection of economic and industrial conditions for which no precedent exists as to fundamental cause and future effects arising therefrom. In the nature of the case, it is difficult to avoid the conclusion that, with base labor costs on a high level in all industries producing equipment and maintenance materials and other supplies used by street railways and with their own operating wage scales similarly elevated, there can be no marked recession in existing levels of total operating costs and charges exacted by capital, for many years to come. For decades the trend of wages to labor has been upward. Under normal conditions the change upward has been a slow and graduated process. Under normal conditions, a general decrease in wage levels would be an even slower matter. Under what we term abnormal conditions today, which may represent the normal of the future, any material decrease in wages throughout the whole industrial fabric may be expected to be so slow as to be imperceptible. And when the necessity for national and world wide stimulation of production in all directions is contemplated, the prospect of further elevation of cost levels operating progressively throughout the allied fields of production, whether of materials or service, is not at all unreasonable.

The value of capital, and the required return thereto, measured by the same money standards as measure the value of materials and human labor, must necessarily co-ordinate in some degree with the variations of the latter value as expressed in the medium of exchange. The two things interlock and must move up or down together. There may be some lag in movement of one following movement of the other, but it will finally occur in the same direction and continue until equilibrium is established.

Fair consideration of the foregoing leads to the conviction that present day prices furnish the best, as well as a conservative basis for measurement of physical values which will typify, reflect and recognize conditions of operating and capital costs during the future period. The fact that this basis will, in many cases, produce value figures in excess of known cost is immaterial to the deeper question involved of maintaining correct and stable relations between the economic factors governing the premises.

8. Valuation Policy: Experience has shown that regulatory bodies and their technical representatives passing upon valuation matters are usually fair minded, particularly where the material presented to them in support of a given case shows evidence of a consistent purpose to base figures throughout on facts and real conditions, so far as these may be subject to numerical translation. It is unfortunately the case that some valuation proceedings and preparation of data therefor have been based largely upon the trading principle, so that it has become more or less a fixed idea in the mind of the public representative that any figures presented in behalf of the public utility are excessive and subject to substantial reduction. Public authorities in the premises, for political or other reasons, are sometimes governed in their findings by a desire to show a "raison d'être" for themselves, and consider it advisable, on general principles, to find values lower than facts, properly presented, would justify. This vicious condition or atmosphere, the outgrowth of past political and corporate practices, undoubtedly affects many valuation cases and retards equitable settlement thereof.

It is to be hoped that the present distressing situation of the street railway industry will bring about closer co-operation between companies and regulatory bodies on moot questions of valuation, and a clear appreciation by both that nothing ultimately is to be gained either by corporate or public interests by departure from ascertainable facts and practical principles of equity. It is important, too, that regulatory bodies should realize the ultimate wisdom of a liberal policy in deciding questions of valuation on which reasonable doubt exists. Better by far to err on the side of a too liberal valuation than the opposite and so strengthen rather than weaken the position of the utility. The per capita cost to the public of liberal valuation policies is nothing compared to the cost of the reverse. The inherent nature of the problem is such that the company is frequently unable to produce unassailable proof of certain items of value, evidence of which, while sound and logical, may be largely circumstantial. The general public has much to gain and little to lose by a country-wide policy of liberality in utility valuation cases, and much to lose and little to gain by any policy which may be construed as oppressive. Practical and not academic considerations should govern here.

WORKING METHODS OF VALUATION

It is a matter of major importance that, with general principles of valuation developed and established along sound and logical lines, attention be turned to the equally, and possibly more, vital matter of making practical use of them. In other words, systematic methods should be developed for attacking the problem presented, not only by the necessity of an inclusive inventory and specifications of items of property and investment value, but also the development and application of unit values upon a basis that can withstand critical analysis.

The valuation problem should be approached and carried consistently through to a conclusion with the constant object in view of developing reasonable and defensible supporting detail for every figure appearing in the final valuation report. This applies to tangible as well as intangible items of value. Where certain of these are believed to exist but are not susceptible of logical supporting argument and connecting figures, they should be presented frankly in their proper classification. The attempt to support such items with bolstered up argument rarely, if ever, produces anything but unpleasant suspicions which adversely affect other departments of tangible and intangible valuation in which the company is well fortified.

Unit labor and material costs, forming the basis of total

physical values, should be built up step by step in a way that will show the elements of all direct and semi-direct charges against the particular class of property or work to which they apply, and by a method which will show clearly upon investigation how such elements have been derived. Careful attention to these details is of the utmost importance as proof to the examining body of the integrity, fairness, and logic of the developed unit cost structure.

The development of unit figures should rest primarily upon the consideration that practically all classes of railway construction work may be resolved by analysis into a sequence of divisions and sub-divisions of constructive processes. These generally do not conform with standard construction accounting procedure, so that a logical development of unit costs must go further than simply analyzing construction accounts.

For example, in building up substantiating detail for unit and total values of tangent track work, the following plan of inventory and valuation, systematically carried out, provides maximum assurance of credit for all discoverable items of property and support for their valuation:

I—Classification of Tangent Track by Types:

- (a) Survey of all tangent track to determine where changes occur in:
 - 1 Rail section and weight
 - 2 Joints
 - 3 Bonding
 - 4 Ties
 - 5 Trench depth
 - 6 Ballast
 - 7 Paving
- (b) Definition of track lengths by classes of construction, A, B, C, etc., this being considered to change wherever a change occurs in any one of the main items above listed. Summary of construction classifications by types, lengths and street locations.

II—Development of Unit Costs Applying to I-(b) Per Unit Length:

- (a) Material items occurring in various classifications, A, B, C, etc.
 - 1 Rail, by sections and specifications
 - 2 Joints by types and sizes
 - 3 Bonds by types and sizes
 - 4 Spikes
 - 5 Ties by sizes and specifications
 - 6 Ballast by specifications
 - 7 Paving by occurring classes
- (b) Track labor
 - 1 Segregation of construction into natural sub-divisions and sequence of processes
 - a—Clearing
 - b—Excavation—rough
 - c—Excavation—to line and grade
 - d—Ballast—first course placing and levelling
 - e—Ties—rough placing
 - f—Ties—spacing
 - g—Rail—rough placing
 - h—Joints—temporary bolting
 - i—Rail—gage and spiking
 - j—Bonding—attachment of bonds
 - k—Joints—final bolting
 - l—Ballast—tamping, placing second course, first track surfacing, and back fill
 - m—Operation over track
 - n—Second track surfacing (where required)
 - o—Paving
 - p—Teaming and hauling for above, classified by operations
 - q—Storage of materials—Unloading
 - Labor
 - Hauling to central storage
 - Handling in central storage
 - Hauling to sub-storage
 - r—Transportation of men on and off job
 - s—Miscellaneous labor—
 - Watchmen
 - Water boys
 - Time clerks
 - t—Supervision on job

Each one of the above defined processes represents a time and labor consuming operation and constitutes an element of total labor costs. Based on actual time studies and experience in other similar construction, supplemented with consultations with the intelligent types of track bosses, very close estimates of unit man-hour costs, by classes of labor, for detail operations and combinations thereof may be developed, to which their wage rates may be applied. It has been found that total labor costs per mile, established step by step in this way, check out very closely with actual performance, as disclosed by analyses of particular jobs. Cost figures so established are evidently not open to serious question.

III—Incidentals:

No matter how carefully and painstakingly the inventory of property is taken, it is well known that a large number of items, small in themselves, but representing an important amount in the aggregate, will, in the nature of the case, be overlooked. An analysis of the details of construction vouchers covering almost any class of work will always disclose numbers of items of which the most imaginative estimate would fail to take account. These represent an absolutely legitimate element of valuation, for which due allowance must necessarily be made in the form of a percentage addition, most conveniently made to basic unit costs. The amount of such addition may be properly determined by analysis of incidental details from construction vouchers applying to the particular class of work concerned, which gives a fair and defensible basis for this. As the "incidental" item varies from 2 per cent to as high as 8 per cent and 10 per cent, depending upon the class of property or work, careful attention to the development of supporting figures for the percentages used is advisable.

IV—Contingencies:

A few years' first hand experience with construction jobs in the field is the best possible school to develop appreciation of the importance and necessity of liberal allowance for unforeseen contingencies encountered in the usual operation. The character and cost of exceptional or extraordinary contingencies actually met in a given situation can generally be established through analysis of job records and consultation with engineers and foremen handling different types of construction on the company's system. Much valuable historical information relative to invisible physical investment may be collected in this way, and forms an excellent groundwork for developing a fair allowance for this item, representative of practical conditions met in a given situation.

GENERAL

The principles outlined in the foregoing may be likewise applied to other classes of street railway property, with such modifications as may be necessary to recognize differences in construction processes inherent thereto and subject to numerical cost measurement. This applies with particular force to the inventory of special track, analysis of typical layouts, etc., as well as to distribution systems in which property values are constituted in large numbers of similar or identical items of equipment.

The basic thought in the whole inventory question should center about the importance of taking and listing quantities in such a way as will permit of the application of unit costs determinable from analysis of natural sequences of construction processes. In other words, the material items should be taken and grouped in a way that will permit of attachment of ascertainable labor costs connected therewith and ultimate charging into the classification of accounts used by the company. There cannot be too much emphasis

laid on the necessity of "system" in scientific inventory. Lack of it will surely and inevitably result in confusion, inaccuracy and defective accounting for existing values which are then easily opened to question. Working papers and figures should be laid out and arranged to provide for ready checking of statements and figures appearing in the valuation report for the convenience and intelligent consideration of the examining body.

In the valuation of large street railway properties it is often either desirable or essential for many obvious reasons to work out allocations of values to various companies, or groups thereof, constituted in the underlying corporate structure.

This involves an analysis, in some cases very complicated, of the corporate history of the property as it exists, the corporate processes through which it has been developed and of the terms and conditions of leases, mortgages, operating agreements and similar instruments through which such corporate processes were consummated.

Electrolysis Amelioration at Kansas City

AN ELECTROLYSIS Committee has been formed at Kansas City with S. H. Grauten, electrical engineer Kansas City Railways, as chairman. The committee includes also a representative from the Bell and Home telephone companies, the Western Union and Postal telegraph companies, the water company, gas company and electric light company. Meetings are held monthly.

The committee was organized for the purpose of studying electrolysis conditions which might affect all the utilities having underground structures. The first step was to adopt a unified system of drainage for all companies owning underground cables.

Aside from the work of the committee, the railway company has made considerable progress in rehabilitating its feeder system, having already installed an insulated return system on two substations. It is expected that a similar work will be completed on a third station during the present year.

At one substation located in the Kaw River bottoms an elevated structure extends for about $\frac{1}{2}$ mile west and 1 mile east. This is a double-track structure with four guard rails, making available eight rails laid on ties and well insulated from the structure. It was arranged for these rails to act as insulated return feeders and thus about 40,000 lb. of return cable was salvaged. Owing to the fact that this cable had been well grounded by part of it lying in the bottom of the Kaw River, electrolysis conditions were much improved by its removal.

New Officers of New York Railroad Club

THE following officers of the New York Railroad Club assumed their duties on Nov. 21, the meeting held on that date being the first one under the new administration: President H. C. Manchester, superintendent of motive power and equipment, D. L. & W. Railroad, Scranton, Pa.; first vice-president, J. A. Droege, general superintendent New Haven Railroad; second vice-president, J. S. Doyle, superintendent of car equipment Interborough Rapid Transit Company; third vice-president, F. T. Dickerson, assistant to the president C. R. R. of N. J.; treasurer, D. W. Pye, president Tuco Products Company; executive member, J. J. Dempsey, vice-president Seamans Oil Company; member of finance committee; C. C. Castle, vice-president National Railway Appliance Company.

Cutting Down Operating Expenses on a Small Interurban Road

The Cincinnati, Lawrenceburg & Aurora Electric Street Railroad Has Made Large Annual Savings by Eliminating Useless Material, Reducing Labor Cost and Speeding Up Cars

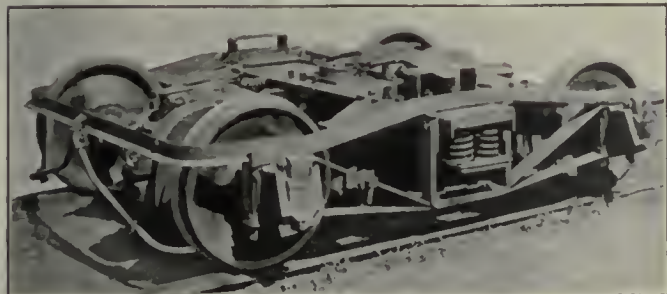
By C. T. DEHORE

Railway and Lighting Department, General Electric Company, Cincinnati, Ohio.

THE Cincinnati, Lawrenceburg & Aurora Electric Street Railroad had been for several years in a receivership, when in 1917 operating expenses commenced the rapid upward trend that has proved so disastrous to the entire industry. Under this condition, the operators faced the alternative of abandoning operation or of materially reducing operating expenses. They decided on the latter course and as a result of their efforts

the business center of Cincinnati and there is no way of getting freight up town. The city lines are wide gage, whereas the C. L. & A. gage is standard. Passengers are transferred at the eastern terminus (Anderson's Ferry) to the Cincinnati Traction Company's cars, which transport them up town.

As passenger earnings of the company had remained practically stationary for seven or eight years and in the



EXTERIOR, INTERIOR AND TRUCK OF LIGHTWEIGHT INTERURBAN CAR FOR CINCINNATI, LAWRENCEBURG & AURORA ELECTRIC STREET RAILWAY

power costs were, during the past year, cut more than 50 per cent; maintenance charges approximately 44 per cent, and platform costs 20 per cent. The return for the first year was about 50 per cent on the net investment in new equipment. The result was achieved by the use of modern, light-weight cars and equipment, the purchase of power from a large central station plant and its distribution through automatic substations, and the elimination of some unnecessary stops by locating part of the road on a private right-of-way instead of in city streets.

The Cincinnati, Lawrenceburg & Aurora Electric Street Railroad is an interurban line 32.6 miles long, running west from the outskirts of Cincinnati (Anderson's Ferry) to Lawrenceburg and Aurora, Ind., a distance of 24.9 miles, with a branch line to Harrison, Ohio, 7.7 miles long.

A half-hourly service is given between Cincinnati and Valley Junction; and every other car branches off at the junction giving hourly service to both Aurora and Harrison.

No freight business is handled on the road because at present the eastern terminus is approximately 6 miles from

fall of 1917 there was the prevalent increase in cost of labor and material, the management decided to invite suggestions from the General Electric Company's engineers as to ways in which expenses could be reduced. These engineers inspected the road, analyzed operating costs and checked up the equipment in use. They made certain recommendations for the reconstruction of the road, which the management put into effect. The details of these and the results are explained below:

CAR WEIGHT CUT 50 PER CENT

In 1917 the rolling stock consisted of eight 44-passenger cars, equipped with four motors on 33-in. wheels, geared for about 35 m.p.h. free running speed and weighing from 50,000 to 52,000 lb. when officials of the Cincinnati Car Company were consulted, they offered to build a car of equal seating capacity, on trucks with 24-in. wheels, suitable for interurban service, which, with four low-wheel motors, would weigh not to exceed 25,000 lb. The substitution of this type of car for the existing equipment would obviously cut the power consumption in two, and effect

material economies in track and equipment maintenance. Seven of these cars were purchased, the use of the old cars being discontinued and the latter were offered for sale.

The cars are a radical departure from those usually found on interurban roads, and as far as we know are the lightest cars in this class of service. The car floor is flush with the platform, and the open bulkhead design is used.

The cars are of composite wood and steel construction with monitor roof and inclosed platforms. They are constructed with the wide body corner posts, or piers of steel, and window posts, letter-board and roof of wood.

The adoption of the open-bulkhead design of car, with flush platform, low wheels and light-weight trucks and electrical equipment, has resulted in a 44-passenger car having a free running speed of 35 m.p.h., weighing but 25,000 lb. complete.

The energy consumption of this car is 1.7 kw.-hr. per car-mile, including line, transformer and converter losses, and the cost of power per kilowatt-hour is 1.2 cents, making the power cost per car-mile about 2 cents.



FERNBANK AUTOMATIC SUBSTATION OF THE C. L. & A. LOOKING TOWARD DIRECT CURRENT END OF ROTARY CONVERTER

A comparison of the weights of the old cars with the new is given in Table I.

The electrical equipment consists of four GE-258 motors, K-12 double-end control, General Electric straight air brakes with emergency feature and conductor valves.

TABLE I—COMPARISON OF OLD AND NEW CAR WEIGHTS

	Old Cars Pounds	New Cars Pounds
Body, including conduit, piping and equipment hangers.	22,700	13,500
Electrical equipment	14,400	4,750
Air brake equipment	1,400	850
2-arch bar type trucks	13,500	6,000
Total weight	52,000	25,100

TABLE II—DATA REGARDING THE NEW CARS

Seating capacity	44
Length over all	40 ft. 0 in.
Height—rail to top of trolley base	11 ft. 3 in.
Extreme width	8 ft. 3 in.
Height—rail to step	16 in.
Height—step to platform floor	12 in.
Width of aisle	22 in.
Width of seat	38 in.
Length of platforms	4 ft. 7 in.
Width of door openings	30 in.
Trucks	Cincinnati Car Company arch bar type
Truck centers	20 ft. 6 in.
Wheel base	5 ft. 8 in.
Size of wheel	24 in.
Material of wheel	Steel
Type of motors	4-GE-258-C 25-hp.
Control	Double-end K-12
Lighting	11 GE combination shade holders and fixtures—Hollophane shades down center of car.
Heaters	16 Consolidated No. 199-0 foot rest heaters with Gold thermostatic control.
Fare collection devices	Ohmer fare registers.
Entrance and exit	Near entrance—front exit.

using a CP-25, 10-ft. compressor. The electrical equipment and air brakes combined weigh about 6000 lb.

AUTOMATIC SUBSTATIONS PERMIT SALVAGING OF COPPER

In 1917 this company was producing its own power in a 600-volt direct-current steam plant at North Bend, 9.9 miles from the eastern terminus of the road, and 15 miles from Aurora. Due to the extremely long stub-end "feeds" approximately 42 miles of 400,000-circ. mil copper feeder and 22 miles of No. 0000 feeder had been put up.

A proposition was secured from the Union Gas & Electric Company in Cincinnati, covering the furnishing of 3-phase, 60-cycle current at 33,000 volts. The power company built the transmission line to the substations, and it was found that power could be purchased at a somewhat lower figure than it was costing to manufacture it, particularly in view of the extreme high cost of fuel. A contract was therefore entered into with the Union Gas & Electric Company. The power contract specifies a maximum demand rate of \$1.50 per kilowatt per month, based on fifteen-minute readings on four consecutive days in the month,



INTERIOR OF FERNBANK AUTOMATIC SUBSTATION LOOKING TOWARD ALTERNATING CURRENT END OF ROTARY CONVERTER

with a sliding-scale rate for actual energy consumed, depending upon the amount used. Power is delivered at the substations on the high-tension side and measured by printometers with watt-hour meters.

This contract enabled the company to secure the full benefit of the reduction in energy consumed, and it also enabled them to dispose of their old boilers, engines and generators.

An order was also placed with the General Electric Company for two 200-kw. automatically operated substations. These were designed to receive 33,000-volt, 3-phase, 60-cycle power, and deliver 600-volt, direct-current power. Substation No. 1 was located at a point approximately 6 miles from the eastern terminus, and substation No. 2 was located at a point approximately 8 miles from Aurora.

Both substations are entirely automatic in their operation and both are equipped with time clocks, shutting them down at a predetermined hour around midnight. The clock cuts in again at a predetermined hour early in the morning and starts the substation. A control wire is run from substation No. 1 to the car shops at North Bend, so that the substation can be started up at any time between the midnight and starting time in the morning should occasion demand.

The substation buildings are of concrete blocks, the exterior and interior appearances being as shown in the accompanying illustration. The equipment has all of the standard protective devices developed by the manufacturer, such as those for speed limit and overload protection, ther-

mostats on bearings and resistors, etc. The high-tension lightning arrester is of the new oxide-film type, requiring absolutely no attention. The direct-current arrester is of the standard aluminum cell type.

The use of automatic substations was decided upon to eliminate substation attendance, to reduce feeder copper to the lowest point and to improve the trolley voltage.

With the old 600-volt direct-current generator system, the extremely long stub-end "feeds" and the heavy cars approximately 42 miles of 400,000-circ.mil copper feeder and 22 miles of No. 0000 feeder was required. Under the new plan 400,000-circ.mil feeder is used between the two substations, approximately 9 miles. A No. 0000 feeder is used from each substation to the end of the line and a No. 0000 feeder extends down the Harrison branch, making a total of 21.7 miles. The 33 miles of 400,000-circ.mil feeder no longer required has been taken down and salvaged.

LOCAL PUBLIC WAS REASONABLE

The first 6 miles from Anderson's Ferry is within the city limits of Cincinnati and the line was double-track, with girder rail through the streets of the suburbs. The franchise had only a few years to run, and the operating officials had been of the opinion for some time that it would be good policy to remove the tracks for 3 miles through the villages of Delhi, Sayler Park and Fernbank, and to re-lay them on private right-of-way adjoining the Big Four Railroad, which is only 200 ft. distant from the old line through the streets. There were considerations favoring this move: (1) The old track was in poor condition and would require rehabilitation shortly in any case. (2) Should the city decide to improve this street with brick, it would mean paving charges which the company could not afford. (3) Several curves and grades could be eliminated, a number of stops could be abandoned, and a faster schedule could be maintained.

Negotiations were entered into immediately for a new franchise, with the privilege of making the suggested changes in track. The Big Four Railroad was also approached with a view to securing the desired right-of-way. The franchise was granted in December, 1917, and the use of the right-of-way was also secured at a nominal rental. Three miles of double track in the villages mentioned was abandoned, and one track of the 3 miles of double track between Anderson's Ferry and Delhi was also abandoned and taken up. The second track between Anderson's Ferry and Delhi is off the main thoroughfare, so that no change was thought desirable in this piece of track.

Work on the new roadbed was started in the spring of 1918. This has gravel ballast with only one or two curves and no grades. The number of stopping places for the first 6 miles was cut from thirty-five to eighteen. Due to the light weight of the new rolling stock the ties were spaced on 2-ft. 6-in centers instead of the usual standard 2-ft. centers.

INCREASING THE SCHEDULE SPEED OF CARS

The schedule in 1917 called for six cars to give a half-hourly service to Valley Junction, and hourly service to Aurora and Harrison.

A layover of five minutes was allowed for each car at Anderson's Ferry, with ten- to fifteen-minutes layover at Aurora and Harrison. By reducing these layovers to approximately three minutes at each end of the line, and utilizing the possibilities of the new right-of-way and elimination of stops, the running time was reduced, and it is now possible with the new cars to maintain the same schedule with five cars instead of six, and no difficulty is experienced in keeping the cars on time. This one feature

alone reduced the operating expenses per year approximately \$7,500.

With the light cars and the new right-of-way if has been found possible to reduce the annual maintenance cost of track and roadway approximately \$2,713. The actual costs of operation and date covering the old system as compared with the new are given in Table III.

TABLE III—COMPARATIVE OPERATING DATA—THEN AND NOW

	Old System July, 1917, to June, 1918	New System July, 1919, to June, 1919	Decrease or Increase
Car-miles	533,556	556,389	22,833 inc.
Car-hours	37,778	37,436	342 dec.
Kilowatt-hours per car-mile,....	3.56 d. c.	1.7 a. c.	1.86 dec.
Platform wages at 90 cents per car-hour	\$34,000	\$33,692	308 dec.
Power cost	36,423	17,539	18,884 dec.
Maintenance of cars and equipment.	7,421	4,150	3,271 dec.
Maintenance of track and roadway.	15,073	12,359	2,714 dec.
	\$92,917	\$67,740	\$25,177 dec.
Reduction in operating costs \$25,177.			



EXTERIOR OF FERNBANK (OHIO) SUBSTATION

Full benefits from the increased schedule speed, resulting in running the service with five cars instead of six, are not shown in the above figures, due to the fact that this schedule was not put into effect until January, 1919. During the next twelve months it is expected that the item of car-hours and platform wages will decrease about 20 per cent as compared with the old system, bringing the total savings up to about \$30,000 per year.

Power cost will also show a reduction, due to the fact that the 1918-1919 figures cover the use of a portable hand-operated substation, requiring two attendants and involving a rental charge. This station will be released in September, 1919, so that these items of cost will be entirely eliminated.

From the above it will be noted that the company has made 22,833 more car-miles with 342 fewer car-hours, with a reduction in all items of expense. In addition, it has done approximately 25 per cent more business as measured by receipts and number of passengers carried.

The patrons of the road are very much delighted with the new cars and the reduction in schedule. These light cars with 24-in. wheels ride considerably better than the old-type cars with 33-in. wheels, and the cars are constructed so that there are no obstructions to the passengers' view. As the road follows the Ohio River quite closely, this fea-

ture is appreciated by the passengers. The center-lighting scheme with intensive Holophane reflectors is also a cause of considerable favorable comment, as compared with the cluster-type lighting which was installed in the old cars.

LOOKING BACK OVER THE PAST YEAR

The cars have now been operating for a year with no unusual troubles either electrical or mechanical, and with a very low maintenance cost; track repairs have also been considerably reduced since their installation. The reconstruction of the road is now complete, and at the present time there is not a mile of bad track in the system. The substation equipment and rolling stock are in excellent condition, and the substations require the attention of one man only a few hours each week. As this man looks after the substation in connection with his other duties at a slight increase in salary, the labor cost is practically nothing.

The rates of fare on this road are exceptionally low and up to the present time have not been raised. If the com-

pany can secure a reasonable increase in rates to offset some of the exceptional high prices of labor and material, it is believed that the receivership can be lifted and the road made to pay fixed charges and possibly a small return on its capital stock.

Due to the fact that the road is partly in Indiana and partly in Ohio, with franchises in several municipalities, considerable delay has been experienced in getting action on the fare question.

In conclusion, I wish to express my admiration for the spirit of the officials of the C. L. & A., who have had the foresight and courage to go to the limit to save this road from abandonment. Had they continued under the old plan of operation, the road would have been unable to meet operating expenses, to say nothing of interest, and as the receiver is not allowed to borrow for operation there would have been no recourse but to scrap the road. As it is, the road has been kept intact, the physical property is in excellent shape, and the prospect of raising the receivership during the coming winter is good.

N. Y. R. R. Club's Annual Electrical Night

New York Central Engineers Summarize Recent Progress in Heavy Electric Traction and Arc Welding

AMONG the papers read at the "Annual Electrical Night" meeting of the New York Railroad Club, held in that city on Nov. 21, the principal papers of electric railway interest were the following: "Electrification of Steam Roads in 1919," by Edwin B. Katté, chief engineer of electric traction New York Central Railroad, and "Recent Progress in Arc Welding," by H. A. Currie, assistant electrical engineer New York Central Railroad. Abstracts of these papers follow:

FOUR MODERN ELECTRIC LOCOMOTIVES

First in importance in electrification work Mr. Katté placed the electrical extension of the Chicago, Milwaukee & St. Paul Railway from Othello to Seattle, a distance of 127 miles over the Cascade Range. This is practically complete and is in partial operation, full service being delayed pending the delivery of the passenger locomotives. This is a 3000-volt direct-current system, with the double overhead working conductor, exactly the same as the construction used on the existing and very successful 440 miles now on its third year of operation on the Rocky Mountain and Missoula divisions.

Two new types of passenger locomotives are now ready for services on these divisions. They are designed to operate a 950-ton train at 65 m. p. h. on level track and to average 25 m. p. h. over 18 miles of average 2.2 per cent grade and 20 miles of average 2 per cent grade.

The Westinghouse Electric & Manufacturing Company will supply 255-ton locomotives, the drive being through gears and quills by six twin motors of 700-hp. capacity each. The General Electric Company will supply five locomotives, each weighing 265 tons, and equipped with twelve bi-polar gearless motors, of 270-hp. capacity each. One locomotive of each type has been completed and tested, while the balance of each order is well under way. Soon after the new year all fifteen of these locomotives will be in service.

Another type of passenger locomotive is the one of the New Haven Railroad, designed to haul 900-ton trains in express service between New Haven and the Pennsylvania Terminal in New York City by way of the New York Con-

necting Railroad, over the famous Hell Gate Bridge. These operate on either alternating current at 11,000 volts under a suspended contact wire, or on direct current at 600 volts from the third-rail. Each locomotive weighs 180 tons, of which 115 tons is on the drivers. The motor equipment consists of six twin motors of 170-hp. normal rating each. The drive is through gears and quills. The total one-hour rating of the motors is 2000 hp. and at this rating the tractive effort is 21,000 lb. The motor armatures are permanently connected in four groups of three in series. Several of these locomotives are now in successful operation.

A description of recent electric locomotives, however brief, would be incomplete without recalling that the engineers of the Pennsylvania Railroad and the Westinghouse Company have developed and tested an electric freight locomotive, weighing 250 tons, for service over mountain grades. This locomotive, known as No. 3931, was tried out in June, 1917, and after the usual test-track trial was put in regular freight service between Philadelphia and Paoli, where to date it has traveled about 5000 miles.

The electric equipment of this locomotive is designed to operate on 11,000-volt single phase current, taken from an overhead contact wire. At each end of the locomotive there are two motors, each driving a jackshaft, the power being transmitted through springs and side rods to a set of three driving axles. The combined one-hour rating of the motors is 4800 hp. and at this rating the tractive effort is 87,200 lb., the maximum speed being 20.6 m.p.h. These facts have been furnished by William F. Keisle, Jr., mechanical engineer of the Pennsylvania Railroad.

But not only in this country have things been happening electrically on steam railroads during the past year, but also in other countries, notably Australia. The electrification of the Metropolitan Railway system of Melbourne was put in service last May. In 1908, C. H. Merz, the distinguished English authority on electric railroading, first reported favorably on the electrification of the Melbourne suburban section of the Victoria Railway System. Proposals were received in 1912 based upon the single-phase, 11,000-volt alternating-current system and upon the 1500-volt direct-current system. Under both methods the propulsion cur-

rent was to be collected from overhead catenary contact wires, supported by steel masts or bridges. It was reported that the single-phase scheme would have cost 23 per cent more than the direct current, and it was estimated that it would cost 21.7 per cent more in annual operation. High-voltage direct current was, therefore, adopted. The delay in completing this work is attributed to war conditions.

Mr. Katté then gave some details of the Melbourne electrification which need not be repeated as they will be found fully covered in articles in this paper, one of which appears elsewhere in this issue.

RECENT PROGRESS IN ARC WELDING

Following Mr. Katté, Mr. Currie gave the results of the experience of the New York Central Railroad with arc welding in repair work. He prefaced his remarks by calling attention to the fact that one phase of welding that has had but little attention is the fundamentally important one of preparation, to which he wished to direct special attention in his paper.

The facilities in the New York Central shops for electric welding consist of both direct-current and alternating-current units of various makes. Depending on local requirements they are either portable or in a fixed location. All of the alternating-current equipment is of the transformer type. All types have given satisfactory service.

The welding equipment comprises the single-operator type of machine, suitably located throughout the buildings and so connected by bus lines that machines can be electrically connected to any outlet throughout the shop. This arrangement gives all of the advantages of multiple-operator machines with none of the disadvantages.

The saving in the locomotive shops since electric welding was installed can hardly be calculated and the additional mileage that is obtained from locomotives is remarkable. This is mainly due to the following: (1) Greater permanency of repairs; (2) shorter periods in the shop, giving additional use of equipment; (3) existing shop facilities can take care of larger numbers of locomotives than originally expected, thus relieving shop congestion; (4) the use of worn and broken parts, which without electric welding would be thrown into the scrap pile; (5) the time required to make repairs is much less and the repairs require fewer men, and (6) a smaller quantity of spare parts need be carried in stock.

Mr. Currie then gave a number of examples of actual processes in welding, stating, for example, that in the work of repairing wheels great success had resulted from welding. Flat spots had been built up without removing the wheels from the locomotives, thus effecting a great saving in time and money. Building up sharp flanges has also been very successful. Many axles are being reclaimed by building up the worn parts. These are tender and truck axles which are worn on the journals, wheel fits and collars. The saving is about \$25 per tender axle and \$20 per truck axle. There is also a large saving in welding broken parts of shop tools and machinery.

Mr. Currie called attention to the importance of careful training of operators for arc welding. Success here depends solely on the men who do the work. They must be instructed in the use of the arc; the type, size and composition of the electrodes for various classes of work, and the characteristics of the various machines which they will be called upon to use. A properly equipped school for teaching these matters would be a valuable adjunct. Manufacturers of equipment have recognized the importance of proper instruction and have equipped schools where men are taught the welding art free of charge.

Another important matter is intelligent supervision. The duties of an inspector might be summarized as follows: (1) To see that the work is properly prepared for the

operator; (2) to insure the good condition of machines and wiring; (3) to advise as to the proper selection of electrodes; (4) to inspect the weld in process of application and when finished, and (5) to act as adviser and medium of interchange of welding practice among shops.

Bare electrodes should be used almost exclusively even for alternating-current welds. Whenever a new lot of electrodes is received, it is good practice to make up test-piece samples so that they may be subjected to careful test and analysis. In railway practice the sizes of electrodes and uses to which they are put are as follows: (1) Flue welding, $\frac{1}{8}$ in.; (2) repair work, broken frames, cylinders, etc., $\frac{5}{8}$ in.; (3) building up wearing surfaces, $\frac{7}{8}$ in.

Mr. Currie concluded by suggesting the following rules for guidance in welding procedure:

1. *Preparation.* The work should be arranged or set up so that the electrodes may be held perpendicular to the plane of welding. When this cannot be accomplished the electrodes must be bent so that the arc will be drawn from the point and not the side of the electrodes. The surfaces to be welded must be thoroughly cleaned and free from grease and grit.

2. *Electrode.* The proper electrode and current volume must be selected for the work to be done.

3. *The arc* should be maintained as constant as possible.

4. *The prepared surface* should for nearly all work be evenly welded over and then the new surfaces welded together.

5. *Shields or helmets* of suitable type must be used with proper color values for the lenses.

In the work described by Mr. Currie a good operator will deposit an average of $1\frac{1}{2}$ lb. of electrode per hour. The limits are from 1 to 2 lb.

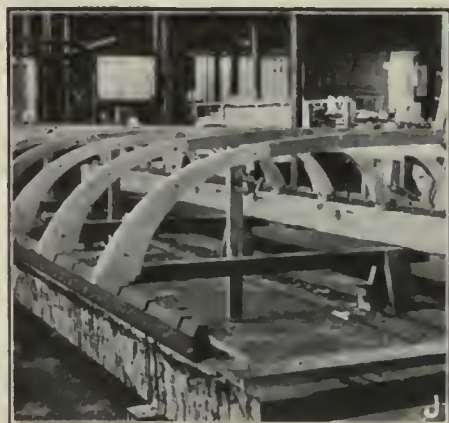
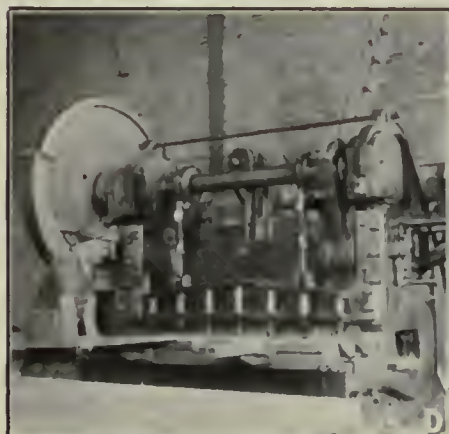
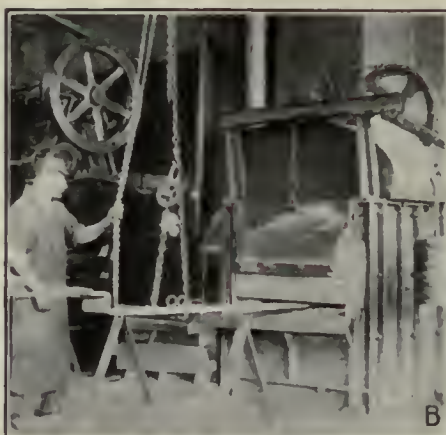
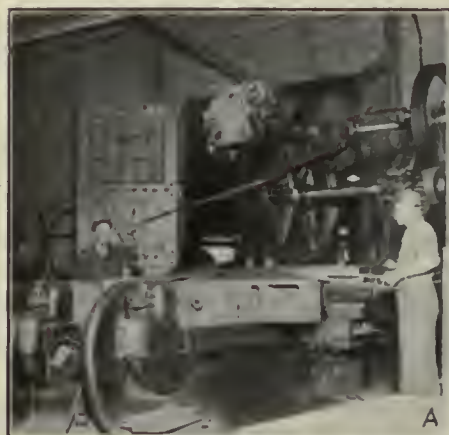
Limiting the Load on Richmond Safety Cars

IN RICHMOND with only eighteen safety cars in operation at the present time, the management has already reached the conclusion that the service which these cars render to the public will be enhanced by observation of a limited load rule. It has adopted the practice of placing a car-full sign in the front window when the number of passengers on the car reaches fifty. With a seating capacity of thirty-two, this gives a standing load of eighteen passengers—certainly a large enough load according to the comment of Mr. Buchanan, the general manager. The contention is that when a car becomes loaded beyond this point, its operation is unduly handicapped. The ingress and egress of passengers is so obstructed that the standing time of the cars is annoyingly prolonged, the passengers become impatient at the delay and condemn the cars, and the operator meets with difficulty in collecting all the fares.

The car-full sign on the Richmond cars has been mounted on a frame inside the car within easy reach of the operator and pivoted about a horizontal axis so that it may be reversed without the slightest delay or effort. On one side the sign reads, "Car Full," and on the other, "Please Have Exact Fare Ready." Thus far there has been no complaint on account of the practice which this sign signifies.

Ivy L. Lee Extends Organization

Ivy L. Lee's organization is now constituted of the following men: J. W. Lee, Jr., W. W. Harris, Daniel T. Pierce, Thomas J. Ross, Jr., Charles W. Towne, Edward N. Lewis, Thomas E. Orr and William L. Dempsey, with H. W. Dengler, Jr., as office manager. The experience represented by this organization includes extended daily newspaper work, technical journalism, political reporting, legislative reporting, advertising management, and other publicity work of many kinds.



Some Steps in the Fabrication of Cars in Detroit United Shops

A—The big bulldozer handles most of the bending work. B—Bolster members are heated in oil-burning furnace before bending. C—Profile shear for cutting angles, channels and bars. D—All large plates for side sheathing are cut in the gate shear. E—Practically all holes in construction of new cars are punched. F—The sides of the car are first assembled on a vertical template. G—The oxy-

acetylene apparatus is used in welding joints. H—There is plenty of riveting to be done. I—The sand blasting is done as the car passes on to the carpenter shop. J—The roof is also built on a template. K—The car is now ready for the paint shop. L—Interior of completed car looking toward the front.

Shop Methods Used in Building Cars

Detroit United Railway Is Engaged in an Elaborate Car-Building Enterprise—Templates Used in Constructing Standardized Interchangeable Unit Parts

IN THE EXTENSIVE car building program upon which the Detroit United Railway has entered it is planned to turn out some six or seven cars per month for an indefinite period and by shop methods which differ materially from those usually employed by electric railway companies. This was briefly referred to in a description of the details of design and construction of these cars in an article in the issue of this paper for Nov. 8, page 863. The several parts of the car are built as units upon templates and later assembled; this method having been devised with the idea of standardization and quantity production. Much of the labor is paid for on a piece-work basis.

NEW EQUIPMENT INSTALLED IN BLACKSMITH SHOP

To facilitate the work in the blacksmith shop several pieces of new equipment have been installed. Among these is a Williams & White No. 28 reversible bulldozer, which is used for most of the bending work. This includes the floor supports, made with special dies and formed cold; the top members of the bolsters, also bent cold; and the bottom members which are first heated in a new Ferguson oil-burning furnace, and such other members as the vestibule support angles, belt rails and sash rests.

Other new equipment includes a Buffalo Forge Company profile shear designed to cut a soft steel bar 3 in. in diameter or the equivalent; a No. 6 plate-bending machine and a No. 8 gate shear, made by Bertsch & Company, the shear being powerful enough to cut a plate $\frac{3}{4}$ in. thick and 78 in. wide, and a No. 2 Hilles & Jones power punch capable of punching a hole 1 in. in diameter through metal 1 in. thick. In the construction of the new cars practically all holes are punched rather than drilled. Many other new machines essential to present-day steel car building have also been installed.

ALL WORK ASSEMBLED BY UNITS ON TEMPLATES

As the steel parts come from the blacksmith shop the two sides of the car are assembled on a vertical template. All parts of this template are adjustable so that if cars of a different design than those now being built are desired they can be constructed on the same template.

The first step in assembling a side is to bolt all vertical T-iron posts to the form. The belt rails and sash rests are then assembled and later the sheet-steel sheathing is bolted in place with its splice plates. The letterboards are then applied and the side sills bolted in position. An angle iron is used at the top of the letterboard as a support for the roof. Next, all parts are riveted together, all joints in sash and letterboard are acetylene-welded and each post is welded at the top and bottom respectively to the letterboard and sash rest.

When both sides have been thus far assembled they are moved along the track and assembled on the body bolsters. After the floor members have been assembled the car is again moved along the track and the vestibules are assembled. All welding is then ground down and the car is sand blasted en route to the carpenter shop and given two priming coats of paint.

The roof is built in three units, the main roof and the front and rear vestibule hoods. Two longitudinal roof angles are first laid out on forms in the carpenter shop and the steel carlines are riveted in place so that one will come



STEEL MOTOR CAR BUILT IN DETROIT RAILWAY SHOPS

over each T-iron post. A pair of wooden carlines is bolted onto each steel carline and two single intermediate wooden carlines are placed between adjacent steel and wood combinations. All holes having been previously punched in the roof angles with corresponding holes in the roof support angles of the car frame, the poplar roofing is applied and covered with canvas duck and the roof, now complete, is assembled on the body framing of the car.

The next step is the assembling of all interior wood work including flooring, post furring and lining. All wiring is done in the carpenter shop, the motor wires and resistance being placed in conduit. All equipment, also, except the transverse seats is installed in the carpenter shop. When the woodwork is complete the bodies are placed on trucks and the leads are connected.

PROCEDURE IN THE PAINT SHOP

From the carpenter shop the car proceeds on its own power to the paint shop where the ceiling receives, in order, a priming coat, a putty coat, sanding, a coat of surfacer and two coats of oil enamel. The interior woodwork receives two coats of shellac, is then lettered and finally receives two coats of flat varnish. The base panels are next primed and given two coats of enamel. The floor is then painted and trimming and bronzing is done.

The outside of the car receives first a putty coat, then a sanding and finally a coat of surfacer. Next the roof is painted and finally the car is given a glaze and two coats of enamel and is striped. The fenders, air tanks, etc., are painted black. After all painting is completed the seats, windows and doors are installed.

The French government is putting into operation a plan for co-ordinating the work of the railroads of the country and for providing collaboration of representatives from the different classes of railway workers with the heads of departments and directors in the management of the roads. This will "head up" in the "Committee of Exploitation" comprising representatives from the administrative and operating departments of the lines, representatives of the government and representatives of the employees. A technical committee will supervise the rolling stock, with membership made up of the chief engineers of the lines, manufacturers of road material and representatives of the employees.

Present Status of Engineering Association Standards

Adoption of A. S. M. E. Boiler Code Has Effectuated Saving in Manufacturing Cost and Improvement in Safety and Operating Methods

BY J. W. WELSH

A GENERAL survey of the work of the power generation committee for the past ten years discloses a great amount of research and investigation on the part of members of this committee.

Its earliest activities have been connected with the boiler house. It is here that the greatest economies in operation have been possible. In the boiler room, however, the problems relate mainly to operating methods and economies as compared with other departments of the electric railway wherein there is a greater use of materials in new construction and maintenance. Notwithstanding this, however, those elements in boiler-house practice which have permitted standardization have received the closest attention and as a result the association has in the Manual the "Boiler Code," the "Specifications for Boiler Tubes," and the "Specifications for the Purchase of Fuel."

Probably the most important and valuable recommendation of this committee has been the adoption of the "Boiler Code" of the American Society of Mechanical Engineers. The preparation of this code has been the work of engineers and experts on this subject, from all parts of the United States. It has resulted in a unification in the construction and manufacture of boilers throughout the country, replacing a condition in which each state had its own requirement. As a result there has been a considerable saving in the cost of manufacture and a tremendous advancement in safety and operating methods.

The "Specifications for Lap Welded and Seamless Boiler Tubes" were developed in the same way as the "Boiler Code" and relate to the chemical and physical properties of steel used in the manufacture of tubes and the methods of installing them in boilers.

In the adoption of a "Specification and Form of Contract for the Purchase of Coal," the association has made an independent contribution as this represents the work of the committee unassisted by outside organizations. These specifications have not been adopted as "standard" but only as "miscellaneous methods and practices," as they serve largely to fix the variable commercial value of coal as its constituent elements change. They should be, however, of material assistance in the preparation of contracts for the purchase of coal.

The researches of the committee during this period of evolution, covering the economics of boiler plants and the improvements in types of equipment for the generation and conversion of electrical energy, have not been so well adapted to standardization. This is well illustrated by the character of the papers that have been presented.

The increase in size of the steam turbine and its substitution for the reciprocating engine and the introduction of centrifugal types of auxiliary apparatus received its greatest development during this period. The commercialization of hitherto laboratory types of measuring devices in the boiler room has permitted the substitution of scientific methods for rule of thumb.

On the other hand, the tremendous growth and complexity of modern power systems have developed great improvements in methods for the control of electrical energy. The possibility of concentrating great quantities of power through the interconnected mesh work of transmission systems has necessitated great advances in suitable control equipment. This is illustrated in the modern

switchboard with its gigantic switching equipment, selective relays and other protective devices capable of interrupting instantly the whole power supply of a large city.

The most notable recent development in power equipment undoubtedly has been the automatic substation. The success of this type of laborless apparatus has opened up a new field in the operation of all forms of power equipment, from the power station to the electric car. The recent advances in the cost of labor makes this improvement particularly advantageous at the present time.

The report of this year's committee on power generation represents a well-rounded view of the whole power situation. While it has made no definite recommendations for standards, yet it includes material of permanent value.

The recommendation of a "Standard Form of Contract for the Purchase of Power," meets a very present need in the increasing tendency of railways to take advantage of the economy and diversity of a central power system.

The paper on "Further Consideration of Operating Performances of Railway Power Station" is of special interest, exhibiting the great improvement in operating economy permissible with modern equipment and presents an interesting study of the effect of various factors (such as the form of load curve, size of unit, quality of fuel, etc.) in determining the switchboard cost of power.

The paper on "Automatic Substations" is a review of the experience of those companies where this form of equipment has been adopted. It contains data covering both construction and operating costs together with a statement of operating performances, and is well illustrated.

Modern Steam-Turbine Plants Show High Degree of Efficiency

IN A PAPER read before the American Boiler Manufacturers' Association at Buffalo, N. Y., Dr. D. S. Jacobus pointed out among other things the importance of the relation of furnace and stoker in the matter of design. With a given boiler arrangement, tube spacing, etc., he said, it usually follows that, to secure a high heat transfer, the draft resistance will be greater than with the same amount of surface provided with baffles that will give a lower rate of heat transfer. If the arrangement of heating surface and baffles is such as to lead to too high a draft resistance, the capacity developed by the boiler with a given draft may be lower than desired. If the arrangement is such as to give a low draft resistance, the efficiency may be less than it should be. In providing a proper design, one of these features must be balanced against the other and an arrangement provided which will give the best all-round results.

The addition of an economizer will increase the economy, say 5 to 10 per cent. Now that the price of fuel is increasing, a greater number of economizers are being installed.

For large plants the efficiency obtainable with a modern steam boiler and steam-turbine installation is greater than could be secured through gasifying the coal in producers and using gas engines. A large steam-turbine plant of the best modern design will generate a kilowatt-hour with a heat consumption, based on the heat in the fuel, of 17,000 B.t.u. This is a round figure for plants of the best modern construction with a load factor of, say, 60 per cent and steam pressures of from 250 to 300 lb. By increasing the steam pressure and raising the superheat, the figure can no doubt be reduced to the neighborhood of 15,000 B.t.u. per kilowatt-hour.* There is no likelihood of the gas engine displacing the steam turbine for large power-generating station work for some time to come.

* As 1 Kw.-hr. is equivalent to 3412 B.t.u., the thermal efficiency (ratio of output to heat in coal) is 3412 divided by 15,000, or 22.7 per cent.—Eds.

Limitations in Steam-Turbine Design

At the A. I. E. E. Meeting Held in New York City on Nov. 14, the Discussion Brought Out the Relation of Speed, Size, Temperature Rise and Other Factors Which Affect Capacity and Proportions

THREE papers on steam-turbine and turbo-generator design were read at a meeting of the American Institute of Electrical Engineers held in New York on Nov. 14. The titles and authors of these were: "Present Limits of Speed and Power of Single-Shaft Curtis Steam Turbines," by Eskil Berg, General Electric Company, Schenectady, N. Y.; "Present Limits of Speed and Power of Single-Shaft Steam Turbines," by J. F. Johnson, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., and "Present Limits of Speed and Output of Single-Shaft Turbo-Generators," by F. D. Newbury, Westinghouse Electric & Manufacturing Company.

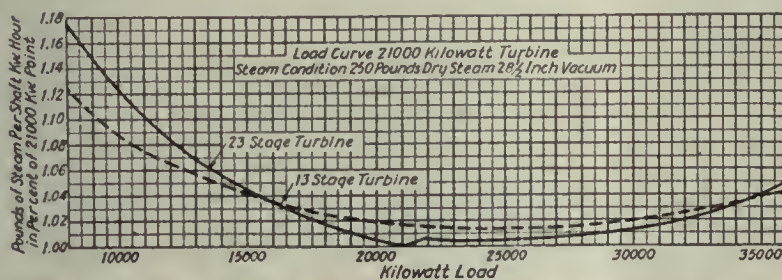
OPERATING CHARACTERISTICS OF LARGE TURBINES

Mr. Berg gave data regarding two typical large turbines, one built for 1800 r.p.m. and the other for 3600 r.p.m. and both of the single-flow type. The 1800-r.p.m. machine has twenty-three stages, the pitch diameter of the first stage

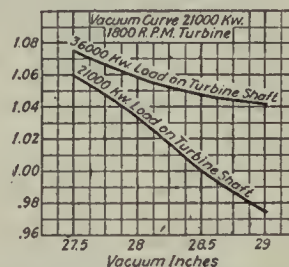
In some of the first large machines of the type discussed, serious trouble has developed through the formation of cracks in the forged wheels. The cracks have started at holes in the wheels provided either for balancing steam pressures on the two sides of the wheels or for the attachment of balance weights. Much evidence has been accumulated to show that the trouble with the wheels has not resulted from stresses in excess of those which had previously been found to be practicable, but was caused by fluttering and vibrations of the wheels due to the lightness and thinness of their construction.

To overcome such troubles as have developed it is simply necessary to make the wheels stiffer and to put in holes in parts near the hub where a suitable reinforcement of thickness can be provided which stiffens the wheels and reduces the stresses near the holes.

Experience has shown that in the absence of a tendency to form fatigue cracks through vibration, over-speed in



STEAM CONSUMPTION OF 21,000-KW. TURBINE, EXPRESSED IN PERCENTAGE OF CONSUMPTION AT RATED LOAD



RELATION OF VACUUM TO CAPACITY FOR 21,000-KW. TURBINE, EXPRESSED IN TERMS OF PERCENTAGE OF RATED LOAD

wheel being 35 in. and that of the last wheel 88 in. The curves reproduced show the best efficiency at 21,000 kw., although with the sacrifice of 5 per cent in efficiency an output of 36,000 kw. can be secured, live steam being by-passed to the eighth stage shell above 21,000 kw., thus accounting for the break in the curve. The curve in dash-line is for a similar turbine in which the first eleven stages are replaced by one two-bucket stage.

A second graph shows the effect of vacuum in the twenty-three-stage turbine. Still others show the efficiency of the machine in the last stage, the percentage of energy in the steam which is turned into mechanical energy in this stage, the percentage of energy in the loss of the exhaust and various losses in the machine. As the overload increases the per cent of the energy transformed in the last stage increases, with reduction in efficiency both of the last stage itself and of the turbine as a whole.

The final diagram reproduced gives a load curve of a 3600-r.p.m. turbine, having five stages, one two-bucket wheel in the first stage, and single-bucket wheels in the other four stages. The first wheel has a pitch diameter of 35½ in. and the remaining four wheels one of 54 in. This turbine is designed for a maximum load of 6250 kw.

From the data given in the paper, Mr. Berg concluded that for a given speed there is one particular size of turbine which can be designed to be most economical as to steam consumption, weight, space and price per kilowatt. Even if a size smaller than this is required, it would in many cases pay to install the larger unit even though it would have to run at reduced load for some time.

such turbine wheels involves relatively little danger as compared with other types of high-speed machinery.

Fluttering or vibration of the web of the wheel not only causes fatigue cracks in the wheels themselves, but also causes loosening and breakage of buckets. A cure for these difficulties is to use stiffer wheels and stiffer buckets, so that the whole structure is incapable of vibration of any amplitude through such forces and periods as arise from the conditions of operation.

WITH HIGH-VACUUM TURBINES THE LIMIT OF POWER IS DETERMINED LARGELY BY THE AREA THROUGH THE LAST STAGE

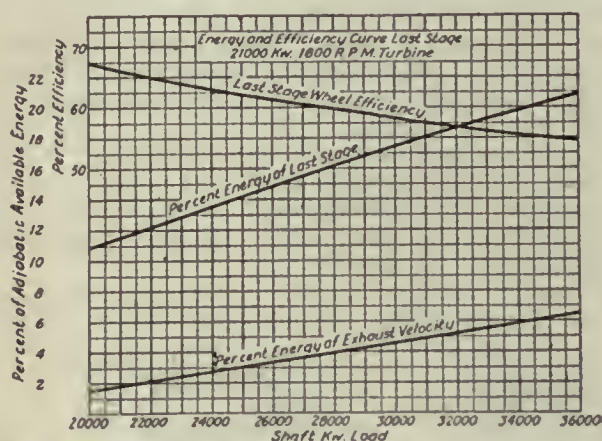
In his paper Mr. Johnson divided the limitations in the size of turbines into three classes—theoretical, physical and economic. That the limiting feature is the area obtainable in the last stage can be seen from the fact that whereas a pound of steam when entering the first stage has a volume of less than 2½ cu. ft., when passing through the last stage it has a volume of approximately 395 cu. ft. when expanded to 28½ in. vacuum, and 585 cu. ft. when expanded to 29 in.

Under theoretical limits Mr. Johnson stated that for a given diameter and blade height, the capacity will be limited by chosen maximum values of steam speed through the blades, in order to keep the leaving losses, or available energy in the steam discharged through the condenser, within permissible limits. Throughout the entire turbine, with the exception of the last few stages, steam speeds only about 25 per cent in excess of the corresponding blade speeds are employed in order to secure maximum efficiency.

In the last stages the steam speed may be twice the blade speed.

When the height of a row of blades is fixed, the area of the steam space is dependent upon the angle formed between the center line of the row of blades and the outlet portion of the blade. The smaller this angle is, the smaller will be the area and *vice versa*; on the other hand, the smaller the angle the higher the efficiency, because of the lower absolute velocity left in the steam discharged to the condenser.

Chief among the physical factors limiting turbine capacity are the physical characteristics of the materials employed and the chosen limits to which these materials may safely be stressed. Conservatism demands adherence to the lower-strength, less-sensitive materials, rather than



CHARACTERISTIC CURVES OF LAST STAGE OF 21,000-KW. TURBINE

special alloy steels; and such materials may, with suitable forms of construction, be safely stressed under the maximum stress condition to within a few thousand pounds of their true elastic limits. The steel regularly used by the Westinghouse company for turbine rotors shows these characteristics with standard 2-in. specimens: Tensile strength 65,000 to 75,000 lb. per square inch; true elastic limit 22,000 to 25,000 lb.; elongation 15 to 18 per cent, and reduction of area 20 to 25 per cent. The material is obtained ordinarily in the form of castings, although occasionally forgings are used.

There exist two interesting relations between the stress at the base of the blade, the steam passage area through the blade and the rotative speed. They are these: (1) For any given rotative speed and blade angle, the steam capacity or steam area through the blades is directly proportional to the stress at the base of the blade, regardless of diameter and blade height selected. (2) For any given stress the area through the blade will vary inversely as the square of the speed.

Increased capacity without decrease of rotative speed or increase of stresses may be obtained by employing multiple, low-pressure stages. This expedient possesses the merit of permitting high-vacuum turbines to be built at speeds and capacities up to approximately the present limits of generator construction, without exceeding moderate diameters, blade lengths and stresses.

An important limit of size and capacity now being approached is that imposed by transportation facilities. For example, the low-pressure rotors of the 30,000-kw. Interborough Rapid Transit turbine had to be shipped with the last-stage blade-carrying element removed. Ways may be devised for partial dismantling of rotor elements, as in this case, although diameter will be one of the limiting factors. This cannot be reduced beyond the point of omission of blading.

While the physical dimensions and capacities of turbines are being constantly increased, it is essential that the

reliability factor be not decreased. The employment of special materials and higher stresses does not usually permit increased capacity or efficiency without a corresponding increase in weight and cost unless reliability be compromised.

SOME ECONOMIC LIMITATIONS

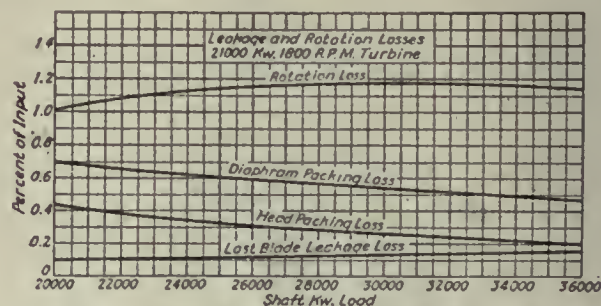
As yet turbines of large capacity are not required in sufficient quantity to warrant equipping and operating shops for their exclusive manufacture. They must, therefore, be produced largely by the same processes and equipment as are used for smaller turbines. As sizes become larger, a greater proportion of special equipment and processes becomes necessary, resulting in increased rates of cost, unless accompanied by very material increase in quantity of production. Under present conditions this economic limited capacity agrees closely with the physical limits of 1500-r.p.m. units.

In the larger low-speed structures, the physical proportions become such that, using ordinary steel and cast iron to which we are limited by the metallurgical art, the distortions due to temperature changes and elastic properties of the material are such that increased clearances and bracings have to be employed. Further development of the allied arts and increased demands for larger units will tend to reduce the influence of this limitation factor. Another factor tending to limit capacity of single units is the loss resulting from suspension of service for inspection or repairs.

In order to avoid the undesirable characteristics referred to, a number of turbine units of capacities varying from 30,000 to 60,000 kw. have been built in which the turbines have been divided into two or three separate compounded elements, each having its own generator and each capable of operating alone on high-pressure steam in emergencies. It is believed that units of this type will continue to be employed for the larger capacities because of the advantages not obtainable in single cylinder types which justify their somewhat greater cost.

GENERATOR OUTPUT IS DETERMINED BROADLY BY ROTOR OR STATOR DIMENSIONS

From the electrical end of the turbo-generator units, according to Mr. Newbury, the maximum output at any speed is obtained when slot space is provided for the maxi-



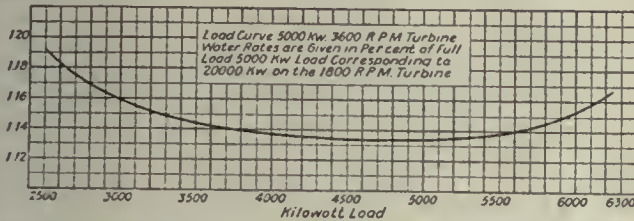
OVERLOAD LOSSES IN 21,000-KW. TURBINE, EXPRESSED AS PERCENTAGE OF INPUT

mum possible ampere-turns (in either stator or rotor) and core cross-section is provided for the maximum possible flux. These conditions require the most effective rotor diameters (or stator bore) and the maximum rotor and stator core length. All factors that limit rotor diameter (or stator bore) or core length have a possible bearing on limiting output.

For maximum output the rotor should have maximum space for winding, and maximum tooth and core section for flux. Obviously these requirements are antagonistic

and the actual design is a balance between slot area and polar area.

Again, as the diameter is increased (with a given speed) there is more room for both winding and flux, but with increase in diameter each pound of copper exerts an increasing centrifugal force and the ratio of slot area to tooth cross-section must be decreased in order to keep within desired stresses. Beyond a certain peripheral velocity, ampere-turns must be decreased in spite of the increase in available space, and the most effective diameter has been



CHARACTERISTIC CURVE OF 5000-KW. 3600-R. P. M. TURBINE SHOWING WATER RATE AS A PERCENTAGE OF THAT AT A LOAD OF 20,000 KW. ON THE 1800-R. P. M. TURBINE

passed. It is seen, therefore, that in order to obtain maximum output at a given speed the rotor proportion must be chosen properly to balance mechanical stresses, rotor ampere-turns and flux.

Voltage regulation has ceased to be a limit to the output of electric generators due to the use of voltage regulators. Permissible regulations are roughly 25 per cent, at 100 per cent power factor, and 40 per cent, at 80 per cent power factor. Obviously such regulations could not be tolerated if regulation were a factor in operation.

Turbo-generators are designed for a maximum speed 20 per cent above the running speed. At this over-speed the tooth stresses should be approximately one-fourth the ultimate strength of the carbon steel and the coil-retaining-ring stress should be approximately one-third the ultimate strength. This results in working stresses, in both cases, of approximately one-half the yield point. It is important that the material be ductile. Carbon steel, with proper working can readily be obtained with 22 per cent elongation and 25 per cent reduction in area, and the alloyed steel should have 22 per cent elongation and 50 per cent reduction. These figures refer to standard 2-in. test pieces under tension.

American design practice has established 400 ft. per second as an upper limit of peripheral speed for maximum ampere-turns in output, for rotational speeds to 1500 r.p.m. and higher.

In the paper Mr. Newbury went on to discuss the factors of ventilation, rotor deflection, winding temperatures and transportation facilities as limitations in generator design. Under the first head he said that designers are already finding it necessary to devise more complicated systems of ventilation in order to take care of 3600 and 1800-r.p.m. ratings now in prospect. As to rotor deflection, obviously as the rotor length is increased, the journal and bearing sizes must be increased in order to keep the shaft stress and the critical speed within desired limits, and the limit may be imposed by bearing losses and temperatures. As to winding temperatures, values higher than 150 deg. result in relatively little gain in rotor ampere-turns on account of the rapid increase in the resistance of the windings. For example, a doubling in temperature rise and rotor loss may result in a gain of only 25 per cent in output. Very high temperatures also introduce danger of trouble from "creeping" of the windings caused by linear expansion. Finally, as to transportation facilities, the same consideration holds as in the case of the turbines. The limiting capacities given for speeds below 1500 r.p.m. can only be obtained by

exceeding present transportation facilities if present design types are adhered to.

In conclusion, Mr. Newbury said that he had not intended to express an opinion as to the wisdom of installing very large single-shaft units. Whether it is desirable or even wise to install very large units—above 50,000 kw.—will depend very largely on the growth and size of the generating stations. As stations become larger there will undoubtedly be a demand for units of 50,000 to 100,000-kw. capacity. If single-shaft generators are justified from the turbine standpoint, there is no question but that such generators can be conservatively designed and constructed.

DISCUSSION BRINGS OUT EFFECTS OF VIBRATION

The three papers abstracted above were read together and discussed as a whole. One fact which was dealt upon considerably was the effect of vibration in producing fatigue in the highly-stressed members in turbine and generator construction. In the turbine the disk wheels, of comparatively thin construction, are subject to vibration, particularly at certain speeds, and there was some question as to the effect of continued vibration on the mechanical properties of the steel.

The retaining rings used to resist the effect of centrifugal force on the end windings of the generator rotors also came in for attention. There was some feeling that the high stresses permitted at present might in time cause deterioration of these rings. However, the discussion as a whole brought out the fact that the effect of vibration can be controlled, and that, if materials are used with reasonable factors of safety, there is no reason why turbines and generators cannot be designed to be entirely reliable.

Handy Shop Carriage for Fenders

A FENDER is an awkward thing for one man to handle even with the ordinary small two-wheel truck. A single-wheel carriage which enables one man to transport a fender about the shop through narrow openings and without any lifting has been constructed in the shops of the Tri-City Railway, Davenport, Iowa.

The frame of the carriage consists of a single $\frac{5}{8}$ -in rod bent to the shape, indicated in the photographs. The ends form two supporting hooks and the center is flattened and



AT LEFT, SIMPLE CARRIAGE FOR TRUCKING FENDERS ABOUT SHOP. AT RIGHT, THE FENDER, WHICH IS SUPPORTED BY AND RESTS ON THE CARRIAGE FRAME, IS MOVED LENGTHWISE

drilled to admit the axle. The latter is attached rigidly to the frame by means of a shoulder and nut. The wheel was constructed entirely with the acetylene welder from sections of steel bar and a piece of steel tube for a hub.

The hooks are placed under the fender as indicated and when the wheel is in a vertical position the fender rests on the carriage frame. The carriage when not in motion also acts as a support to hold the fender upright.

Facts Regarding Motor-omnibus Service *

The Author Advocates the Giving of Bus Service as Auxiliary to Municipal Tramways Although Its Field of Profitable Operation is Limited

By A. R. FEARNLEY

General Manager Sheffield Corporation Tramways and Motors

ON MANY occasions recently when the question of road passenger transport has been under discussion the opportunity has been taken of suggesting that extensions of electric tramways should not be made, but that any further transport facilities required on the roads should be provided by motor omnibuses. This opinion, of course, comes from those who have had no experience in handling passenger transport work by the electric tramcar.

I propose to look at the question from the point-of-view of the municipality engaged in passenger-transport work, and to show as a result of the experience gained while working motor-bus services as auxiliary to a large tramway system, during the past seven years, how and to what extent motor-omnibuses can best be utilized.

Under present conditions it is comparatively easy for any municipality to obtain powers from Parliament to work motor-omnibuses within its own district, and despite the opposition which is generally met with from railway and motor-bus companies, county councils, and urban district councils, it can also obtain powers to work omnibuses in the districts adjoining its boundaries.

In 1907 the Sheffield Corporation obtained a clause which reads as follows: "The Corporation may provide and run motor-omnibuses within the city, and also in connection with its tramways in certain districts adjoining the city on the following routes." Then follows a description of the routes outside the city boundary on which the Corporation is authorized to run motor-omnibuses, and as will be seen from the accompanying map most of the main roads leading into the city are now provided with bus services; on those which are not so provided powers have been already obtained, and in a short time services will be in operation.

Another clause provides that the Corporation shall make payment to the road authority of $\frac{3}{4}$ cent † per bus-mile run by its motor-omnibuses; also that the Corporation shall not be required to make any payment in excess of the sum of $\frac{3}{4}$ cent per bus-mile in respect of any road which has not been constructed or reconstructed so as to be adapted for mechanical traffic.

Further clauses provide that the Corporation shall not be required to make any payment in respect of the cost of raising the standard of any road to meet the requirements of mechanical traffic, and that if a grant from the imperial exchequer is made in respect of any roads towards the cost of maintenance the amount to be paid by the Corporation shall be proportionately reduced.

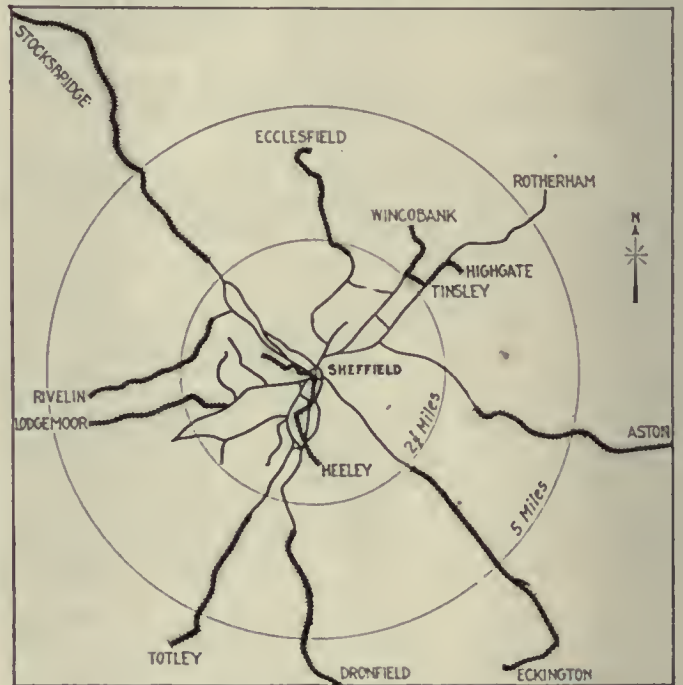
These clauses remain operative for at least five years from March 31, 1919, and were settled by agreement with the West Riding County Council and the Derbyshire County Council so recently as the summer of 1918, after they had had five years' experience in the running of the motor-bus services over their roads.

Another clause in which the Sheffield Corporation appears to have been more fortunate than many other undertakings is in the fare clause. Our clause in regard to this matter reads as follows: "The Corporation may demand and take such reasonable fares and charges for the convey-

ance of passengers and parcels in or on their motor omnibuses as they may think fit."

With the parliamentary authority above referred to, the Sheffield Corporation commenced in 1913 to run motor-omnibus services on a number of routes within the city and as extensions of its tramway routes outside the city and has continued since that date as opportunity offered to extend such system, until it has now services covering 37 miles of road, of which 15 miles is within the city boundary, and 22 miles outside the city on County Council roads. Altogether about forty motor-omnibuses are employed. At least six additional routes are contemplated, a number of which are to be put into operation as soon as a further supply of suitable omnibuses can be obtained.

The results of the first three years operation were excellent but, of course, war conditions, especially during the last two years, made the working of the services very dif-



OUTLINE MAP OF TRAMWAY AND MOTOR-BUS LINES IN SHEFFIELD
Heavy lines show bus routes

ficult. At times, owing to inability to obtain spare parts and carry out repairs, it was almost impossible.

The expenses for the last two years are as follows:

AVERAGE EXPENDITURE PER BUS-MILE			
	1915 Cents	1918 Cents	1919 Cents
Traffic expenses	6.02	9.86	14.17
General expenses	0.74	0.76	1.06
Repairs account	3.83	8.82	9.05
Road maintenance account.....	0.11	0.29	0.40
Power expenses (gasoline).....	3.37	8.31	11.10
Total working expenses.....	14.07	28.04	35.78

Although on country roads the single-deck bus is the more satisfactory type of vehicle, the preference in the district for the double-deck bus is so pronounced that we have tried as far as possible to meet this requirement, 75 per cent being of the latter type.

On the city routes this class of service undoubtedly provides a great public convenience for short-distance cross-town traffic through streets and districts which cannot be served by cars.

The traffic which has been developed on roads branching off from tramway routes is enormous, and has astonished its most sanguine advocates. The use of buses as extensions to existing tramway routes has also proved very satisfactory. In addition to paying their way, they have

* Abstract of paper read at meeting of Municipal Tramways Associations, of Great Britain. For more complete abstracts see *Electrical Review*, London, *Tramway & Railway World* and other British periodicals. This abstract amplifies the brief note printed in the issue of this paper for Nov. 8.
† Amounts in American money have been obtained by assuming a value of 2 cents for 1d.

brought a great amount of traffic to the tramways. What this means in the summer months may be gathered from the motor-bus traffic return for the last completed week, ended Aug. 17, 1919, as follows:

Receipts, \$10,327.10 (fare 3 cents per mile)
Passengers carried, 159,371
Miles run, 20,768 (lost mileage, 59 miles)
Receipts per bus-mile, 50.2 cents
Receipts per bus-mile up to date this year are 47.1 cents

The traffic on bus routes is greater in summer than in winter, the ratio of difference being much greater than on the tramways. There is no doubt that the general effect on the outlying districts is in every way beneficial.

The motor-omnibus, so far as it has been developed up to date, is:

1. An excellent vehicle in acting as feeder of and in connecting up tramway routes and services.
2. An unsuitable vehicle for dealing satisfactorily with heavy town traffic.
3. Quite inadequate for dealing with peak loads.
4. Financially impossible for workmen's traffic at reduced fares.

5. In regard to average speed maintained throughout the day it has no advantage over the electric tramcar.

The maximum seating capacity that we have so far been able to provide is thirty-seven against the maximum of seventy-six on the latest type of tramcar. The new type of bus, of which one has just been put on the streets by the London General Omnibus Company, seats forty-six passengers.

The great difficulty from the passengers' point of view is that only twenty-two passengers on the new type of bus are provided with cover or a comfortable seat under inclement weather conditions which prevail during eight months in the year, whereas the whole of the seventy-six passengers on the tramcar referred to are under cover and traveling under reasonably comfortable conditions whatever the weather conditions may be.

There are very few tramcars running today in the busy manufacturing centers or thickly-populated districts without covers, experiences having shown that for the greater portion of the year the top-deck seat on the open-top car is of little use and the vehicle without top cover becomes practically a single-deck tramcar.

For dealing with the peak loads the Sheffield type of bus with its maximum of thirty-seven seats would be of very little use; for the Tinsley district in Sheffield, each evening we have to provide a service of eighty-two cars per hour, in which time we carry 5576 passengers at an average fare of less than 1 cent per mile. To carry these passengers the number of buses would have to be double the number of cars provided, and in wet or winter weather this would be totally inadequate for the purpose. Given this necessary increase in the number of vehicles, serious loss would result if the same fares as are now charged on the tramways were maintained.

The 3½-ton maximum weight allowed for the London bus is of no use for the provinces. Actual experience has shown us that a body of the London type after two years on roads such as are met with in the Midlands and North County is in such a condition that very heavy repairs are required, and in fact it then becomes a question whether such type of body is worth repairing for work under such conditions. The makers themselves have confirmed this opinion, and today decline to build a body of that type for use in the provinces.

The minimum weight of a double-deck omnibus for roads such as are found in our district is 4½ tons, and the difference in weight of vehicle per passenger carried in the provinces is, therefore, very little in favor of the motor-omnibus, as compared with the tramcar.

COMPARATIVE FIGURES FROM THE 1918-1919 SHEFFIELD ACCOUNTS

	Per Car-Mile, Cents	Per Bus-Mile, Cents	
Working expenses.	24.77	35.79	Bus Expenses Are
Service of debt (capital)	3.37	1.85	44.5 per cent more than tramways
Total expenses.	28.15	37.63	45.8 per cent less than tramways
	Tram-Ways, per Passenger, Cents	Omni-Buses, per Passenger, Cents	33.7 per cent more than tramways
Working expenses.	1.43	4.27	Bus Expenses Are
Service of debt (capital)	0.19	0.22	198 per cent more than tramways
Total expenses.	1.63	4.49	12.3 per cent more than tramways
	Tramways per Seat per Car-Mile, Cents	Omnibuses per Seat per Bus-Mile, Cents	176 per cent more than tramways
Working expenses.	0.46	1.06	Bus Expenses Are
Service of debt (capital)	0.06	0.05	131.3 per cent more than tramways
Total expenses.	0.52	1.11	129 per cent less than tramways *
	Per Car-Mile, Cent.	Per Bus-Mile, Cents	114.1 per cent more than tramways
Traffic receipts ...	83.13	40.91	Bus Receipts Are
Traffic receipts per seat provided ...	0.61	.122	23.5 per cent more than tramways
Average fare charged per mile.	1.30	3.0	98 per cent more than tramways
			130 per cent more than tramways

* This is an important figure and one which is often entirely overlooked by the motor-bus advocates. The impression usually left is that the difference in capital expenditure is much greater.

Appended are some figures for the year ended March 25, 1919, showing:

1. That the revenue expense of running the motor-bus is 44.5 per cent more than the tramcar. After giving the motor-omnibus the benefit of its comparatively lower capital expenditure it still costs 33.7 per cent more than the tramcar to work per mile.

2. The revenue expenses per passenger carried on the motor-omnibus are 198 per cent more than on the tramcar. The total expenses per passenger carried are 176 per cent more on the bus than on the tramcar.

3. Per seat provided, the omnibus revenue expenses are 131.3 per cent higher than the tramcar revenue expenses. The total expenses per seat provided are 114.1 per cent higher on the bus than on the tramcar.

The average speed of the buses is 9.97 m.p.h., and that of the tramcars 8.65 m.p.h., that is, 15.26 per cent in favor of the bus. Bearing in mind, however, that 75 per cent of such bus mileage as is here referred to is run on urban and rural roads, it will be seen that under similar conditions the speed of the tramcar in the provinces is easily equal to the speed of the bus, so that in this respect there is nothing to choose between the two vehicles.

What is very necessary at present to assist the motor-omnibus undertakings in carrying out their work is a plentiful supply of fuel at a reasonable price; that is not a price a cent or two below the monopoly price of the "petrol ring," which is not the way to encourage the use of either benzol or any other home-produced motor fuel.

In conclusion, I would like to suggest that it is the duty of every tramway-owning municipality to undertake this work.

New Executive Members City Representatives' Association

In the report of the organization of the American Association of City Representatives of Electric Railways at Atlantic City, reported in the issue of this paper for Oct. 11, the statement was made that the executive committee was not filled and that two other members of the committee would be named later. W. C. Culkins, secretary of the association, now announces that these places have been filled by the election of Fielder Sanders, Cleveland, and Lynn D. Milam, Dallas.

Straightforward Publicity Does Bring Results

Experience in Massachusetts and in Several Canadian Cities Is Cited to Show that the Public Wants Facts on the Traction Situation

By ERNEST B. FREDERICKS

Street Railway Publicity Expert, Ottawa, Ont.

DURING the past five years electric railway companies in many cities have taken the public into their confidence to an extent that would have made the industry stand aghast before the era of co-operation began. In the final analysis the new order of things pays. In places where the companies have been in constant touch with their patrons it is noticeable that a much better relationship exists and a much better understanding of operating conditions is had by the public. From this we can deduce the conclusion that the closer the bond between the car riders and the company, the stronger the position of the latter will be when an issue, vital to the industry, is before the people.

LAST YEAR'S MASSACHUSETTS PUBLICITY CAMPAIGN WAS UNIQUE

Concrete examples of what can be accomplished by well-organized publicity campaigns are not difficult to find. In Massachusetts last year there was conducted what will probably stand for some time as a record performance along these lines. It was undoubtedly the most pretentious and extensive campaign of its kind ever waged in behalf of a definite group of public utilities, because it took in the entire State and covered every road operating therein, whereas in most cases a campaign is limited to one city or county, or to the territory served by one company.

At the time the campaign was started practically every electric railway in the State was in financial distress. Service was breaking down, the public was dissatisfied, governing bodies were non-committal as to what they would do, the Public Service Commission had gone as far as it felt it could, the Legislature was "looking into the matter," investigations were pyramided one on top of the other without getting anywhere, and meanwhile the industry was getting to the end of its rope. Everybody admitted that something ought to be done, but no one had anything tangible to offer except the public-ownership advocates who, while not knowing exactly how the State would get out of the mess if it took over the roads, believed that it might be well to "let George do it."

Realizing that quick action was necessary if the business was to be saved, the security holders to the number of more than 15,000 banded together to devise some means of bringing order out of chaos. It looked like a hopeless task but they went at it. An association was formed to conduct a campaign of education, one of the chief objects of which was to try to get the people to unlearn some of the things that they had been taught about the street railways of Massachusetts. This was a man-size job, because for years many papers throughout the State had charged the roads with committing every crime possible in the railway business as well as a number invented as a background to the general arraignment.

To begin with, the association adopted a definite plan for the relief of the roads and came out strongly for a service-at-cost plan adapted to the different needs of the companies and the cities which they served. It was realized that one general bill would not take care of all the roads so three different service-at-cost measures were advocated, one for the Boston Elevated, one for the former Bay State

system and one general bill for the other roads in the State. A jitney regulation measure was also advocated as well as one providing for the carrying of freight.

A press bureau was organized as a branch of the association's work, and every paper in the State was provided with articles of a semi-editorial character dealing with the railway situation and offering the service-at-cost idea as the logical solution of the problem. The papers used the material liberally, many of them asking for special articles in addition to the regular stories. As up to that time there had been no organized effort to get all the facts before the people, the papers and the public were in a receptive mood for the material sent out. The newspaper campaign was supplemented by another phase of publicity work that proved of inestimable value. This consisted of sending capable speakers throughout the State to address chambers of commerce, boards of trade and other organizations, on the street railway question. The advantages of service at cost were dwelt upon and as a result of this part of the campaign the plan advocated by the association was endorsed by practically every organization before which it was presented.

Other meetings were called in various sections of the State to the members of the Legislature representing those sections which were invited and the service-at-cost idea was explained to them. Meanwhile hundreds of thousands of booklets were issued, explaining the situation and showing how the service-at-cost plan appeared to be the best available method of solving the problem. These booklets were distributed by banks to their depositors and the remainder were sent direct to thousands of people known to be interested in public utilities. The banks and insurance companies were very helpful allies because under the laws of Massachusetts such companies are permitted to hold street railway securities, and hundreds of thousands of dollars of bank funds are so invested.

MASSACHUSETTS PLAN SPREADS

Coincident with this campaign a legislative committee was at work drafting various relief measures and the association was consulted frequently before the final drafts of the bills previously mentioned were offered for passage. When these measures were first reported to the Legislature there was a promise of formidable opposition, but the work of the association had been well considered and designed to head off such opposition. The members of the Legislature began to receive letters and petitions from their constituents urging the passage of the service-at-cost legislation. Various public-ownership bills made their appearance, but they received such scant support that they were withdrawn. When the final vote was taken the service-at-cost legislation went through both branches of the Legislature with only a handful of negative votes. There is no doubt that the publicity campaign had a great deal to do with the final result because it acquainted the people of the States with the exact situation and, what is equally important, it offered some definite plan for relief.

Encouraged by the result of the intensive campaign in Massachusetts other places that had been awaiting the

outcome in conservative New England undertook similar campaigns. Montreal was one of the first to follow the Massachusetts lead and, with the service-at-cost plan as a groundwork, a well-planned campaign was conducted which ultimately resulted in the adoption of the very admirable plan now in force in that city.

St. Johns, N. B., then took a hand at the same work and began to tell the people why the local public utilities needed relief and pointed out the special advantages of service at cost. The situation here was a little complicated because the campaign had to cover heat, light, power and transportation. A variety of literature was issued, dealing with the subject from a number of viewpoints and, in a straight-from-the-shoulder series of talks, pointing out just what would have to be done. This literature was sent out directly to the customers of the different utilities and before long everybody in the city knew about all there was to know of the situation. The result was the appointment of a special commission to investigate the case and when the commission made its report it recommended the service-at-cost plan.

The most recent instance of what well-directed publicity can accomplish was shown in the case of Sherbrooke, Quebec, where the citizens voted by a large majority to do away with the existing contract with the street railway company and substitute a new agreement providing for a substantial increase in fares and making other concessions to the company. The report of this case was contained in a recent issue of the *ELECTRIC RAILWAY JOURNAL*. The secret of the success of the new agreement was the nature of the publicity campaign that preceded the vote of the people. In Sherbrooke, as in many other places, there was a strong public-ownership sentiment and, when the new agreement was first discussed, it was freely predicted that the measure would be beaten and that the city would vote to take over the road. The publicity work not only proved the impracticability of public ownership at this time but convinced the people that the best way out of the difficulty was to pass the proposed new agreement.

TORONTO IS STILL OBDURATE

In Toronto a campaign of education was launched about a year ago, encountering a political atmosphere that not only antagonized service at cost but opposed any plan that contemplated relief for the street railway. Certain factions had become obsessed with the idea that public ownership was the only remedy for all public utility ills. Whether this was done as a matter of political expediency or was inspired by public-spirited motives has never been clearly determined. In any event the situation was an impossible one so far as the company was concerned and, while the Ontario Railway Board was in sympathy with the principles of service at cost, the city authorities would consider no plan that involved any kind of relief for the company.

An extensive campaign to tell the people the truth was launched, and a straw ballot showed that the majority of the thinking class were willing to pay a straight 5-cent fare for the kind of service they wanted. When the conciliation board, appointed to arbitrate the wage differences between the employees and the company, handed down a decision favorable to the men it embodied a recommendation that the company be allowed to increase its fares to meet the increased operating costs. The city government "smacked its lips" over the wage award but branded the recommendation as "mischievous," and this despite the fact that it had been shown that the company could not make both ends meet by selling six rides for 25 cents. It was another case where a city "out-Shylocked" Shakespeare's famous character, for Toronto not only insists upon the company carrying out its contract but actually demands more cars

and extended service. Fortunately, there are few cities that have put such a strangle hold on their street railways.

The inconsistency of Toronto's attitude toward the company is reflected in the open discussion that is being carried on relative to the fares that the city should charge when it takes over the road in 1921. This in itself is an acknowledgment that the present fares are insufficient and doubtless the city has learned from its limited experience in operating street cars what it means to run this kind of a business. The city has been operating about 10 miles of a civic road for a short time and has managed to pile up a deficit of more than \$1,000,000. The loss this year will be around \$300,000. A lot of people in Toronto are wondering what the city will do when it takes over the 130 miles of road operated by the Toronto Railway.

LEAVEN OF PUBLICITY IS WORKING AT MANY POINTS

In Vancouver, Winnipeg, Ottawa and other places in Canada publicity campaigns are now under way telling the people about the real conditions in the electric railway industry and how they can be remedied. It is safe to say that the people of Canada are better informed on street railway matters today than they ever were before. That they are taking a real interest in the welfare of the roads is attested by the treatment the companies are getting in most cities. With few exceptions the fare in Canada is less than 5 cents, most of the roads selling six tickets for 25 cents. Many of the companies that are in need of relief would be satisfied with a straight 5-cent fare. Some of the others, and among the latter municipally-operated roads, are not so sure that 5 cents is enough and the day of the 6-cent fare seems not far distant in a number of important cities in the Dominion.

Just what the lasting qualities are of a properly directed publicity campaign is shown in the case of Montreal, where the fare has recently been increased to 7 cents, the second increase since the adoption of the present plan. So well informed had the public been kept that practically no opposition was made to the latest increase. The riding public, being in constant touch with the trend of affairs, has accepted the higher fare as a necessity. The result is that Montreal has one of the best services on the continent, and with a continuance of the present spirit of co-operation manifested by the public the city will doubtless always enjoy good service because the company will be able to keep abreast of the demands made upon it. There is no doubt but that intelligent publicity has made it possible to bring about this condition in Montreal. This case also shows the contrast between a city that will not treat the situation with an open mind, as in the case of Toronto, and a city that decides the question on its merits. One has only to compare the service and equipment in the two cities to find the answer.

In Minneapolis, where a service-at-cost plan is under consideration, a very effective publicity campaign has been under way for some months and it is certain that the public is well informed about what is in prospect. With any kind of reasonable consideration when the plan is voted on by the citizens the service-at-cost plan should be approved by a substantial majority.

Richmond, Va., has been conducting an up-to-the-minute publicity campaign which certainly helped to overcome the opposition that for a long time held up the relief that the road needed and ultimately secured.

The above are but a few of the instances where carefully-planned publicity work has been instrumental in leading the public away from false prophets and showing up the sophistry that has characterized much of the discussion about electric railway matters in the past. Without desiring to discourage any of the efforts that are being made to

educate the public about conditions in the street railway industry I shall conclude by observing that there is a marked tendency, in the case of some literature issued by street railways, to indulge in a vein of flippancy that is hardly to be commended. There is a great deal that the public should learn about the street railway business and scarcely a day passes that does not produce its quota of live news relative to the industry. There is ample material for a lot of straight talk about subjects that are of very serious import to the business and I can find no better advice than to fall back on the old but always forceful command "Do it now"—and put a punch in it.

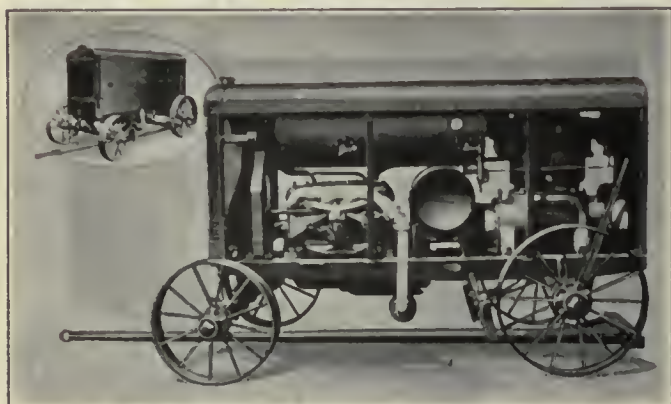
New Portable Air Compressor

ONE thing that has interfered with the use of pneumatic labor saving devices is the trouble and expense of installing an air power plant on a short-time job. Despite the advantages incident to the use of air-operated tools, it is difficult to justify the cost for transporting a stationary machine, the building of a shelter, the setting up of a steam boiler and the laying of a pipe line for only temporary use. To this must be added the cost of tearing down the plant when the job is completed. The portable type of air compressor reduced difficulties somewhat and portable outfits of many varieties have been developed in the last few years.

The Ingersoll-Rand Company has recently introduced a light-weight gasoline engine-driven unit, built in two sizes, to be known as the Imperial Type 14 portable compressor.

These are all-steel outfits and the power plant of each consists of a duplex, vertical compressor, driven at high speed, by a four cylinder, four cycle, tractor type gasoline motor. The outfit, being designed especially for portable use, has unnecessary weight eliminated. The larger machines, of 210 cu. ft. capacity, weigh only 6000 lb. and the 118 cu. ft. unit 400 lb.

The compressors have cylinders cast *en bloc*, with cylinder heads, valve chambers and water jackets integral. Both intake and discharge valves are of plate type and are



PORTABLE COMPRESSOR 210 CU.FT. CAPACITY

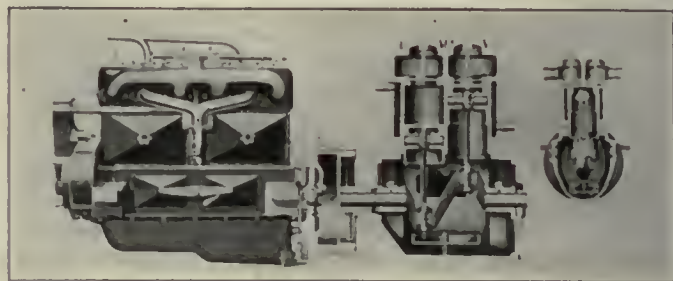
located directly over the cylinder bore. Crankshafts and connecting rods are drop forgings. Air pistons are fitted with three-piece piston rings and, in addition, with an oil wiper ring. This latter returns all surplus oil from the cylinder walls to the crankcase, and is claimed to obviate the difficulty caused by having the air carry an excess of oil into the receiver.

All bearings are die castings of anti-friction metal. Hand holes in the crankcase permit convenient access for adjusting main bearings and those of the crankpins. All parts are lubricated by splash from an oil reservoir in the crankcase.

The compressors are provided with inlet unloading devices which automatically close the compressor intake when the receiver pressure rises above a predetermined limit, and permit the machine to again take up its load when the pressure has fallen a definite amount.

The gasoline driving motors are of long-stroke type, and operate at medium speed. They are equipped with high-tension magneto ignition with automatic governors to maintain constant speed under all working conditions and to prevent overspeeding when idling. A splash oiling system lubricates all moving parts. A starting crank is located at the front of the machine beneath the radiator.

Both compressor and driving motor are water cooled by a circulating system, with centrifugal pump, large radiator and blast fan. The radiators are made up of removable sections, a construction which allows the removal and repair



SECTION OF IMPERIAL PORTABLE COMPRESSOR

of a damaged section without taking down the entire radiator or interrupting the use of the compressor.

Each of these units is equipped complete with receiver, safety valve, drain valves, pressure gage and service valves to which the air hose lines may be attached. When the fuel tank has been filled, lubricating oil provided and the cooling system supplied with water, the units are ready for work.

The mounting of the machines provides a swiveled front axle which moves freely in both horizontal and vertical planes. This, with the rigidly attached rear axle, gives three-point suspension, and permits the outfit to pass over inequalities of the ground without any racking effect or misalignment of the power plant.

The two sizes differ in respect to the location of the air receiver and in minor details of design.

Non-Slip Shoe for Ladder

IN the September issue of the *Railway Mechanical Engineer*, A. G. Johnson describes a safety-non-slip shoe for use on ladders. This shoe is made of a hardwood block and it is fastened to the base of the ladder by means of two steel plates. A pad of rubber is glued and then nailed to the underside of each hardwood block, to prevent the ladder from slipping while in use on a hard or smooth surface. These shoes have been in use in the shop of the Duluth & Iron Range Railroad (a steam road) for a number of years and they have given satisfactory service.

A boiler inspector who recently investigated the causes of a disastrous boiler explosion reported that enough evidence was established to assure the inspector that the cause of the accident was imbrittlement of the plate of the boiler by the action of some alkaline or caustic ingredient in the feed water. This feed water was taken from an artesian well. On analysis it was found that it contained a large quantity of alkaline substance. The inspector advised that users of boiler feed water drawn from artesian wells have the water analyzed by competent chemists who can determine whether it is of such a nature as to cause imbrittlement.

Equipment Standards of the A. E. R. E. A.

Conditions that Have Lead to Standardization by the Master Car Builders as Compared with Those Existing in the American Electric Railway Association— Conclusions as to Standard Articles

By T. A. CHANCE

THE decision expressed in the report of the standards committee presented at the 1919 convention at Atlantic City, to the effect that a determined effort should be made by the association to apply some of the principles of constructive salesmanship to the dissemination and more general use of its standards, makes an analysis of the present status of these standards desirable. A contemplation of the car equipment standards naturally turns one's thoughts to the results that have been accomplished by the Master Car Builders' Association. It may be helpful in studying the electric railway standard situation to compare the individual standards of the two associations.

AIMS OF THE MASTER CAR BUILDERS

In the M. C. B. Proceedings for 1918 an interesting account is given of the formation and objects of the Association, in which it is stated that the organization was founded in 1867 and that:

The objects of the association are the advancement of knowledge concerning the construction, maintenance and service of railroad cars and the parts thereof, by investigation through committees and discussions in convention; to provide an organization through which the members and the companies they represent may agree upon such joint action as may be required to bring about uniformity and interchangeability in the parts of the railroad cars, to improve their construction and to adjust the mutual interests growing out of their interchange and repair; but the action of the association shall have only a recommendatory character, and shall not be binding upon any of its members or the companies represented in it.

The foregoing has been quoted at length to show that the action of the M. C. B. association is not binding. Notwithstanding this fact the M. C. B. Proceedings go on to state:

The question of uniformity in the construction of cars, whereby the parts of cars used by one railroad may be used in repairs of the cars of any other road has been constantly before the (M. C. B.) association. As an indication of what has been accomplished in this direction, the following comparison of parts necessary to be kept on hand for repairs at the date of reorganization (1882) and the present time is a test:

	1882	1918
Axles, different kinds.....	56	5
Journal boxes, different kinds.....	58	5
Couplers, different kinds.....	26	2
Brakeshoes, different kinds.....	20	1
Brake heads, different kinds.....	27	1

It may be asked how such a result was obtained without compulsion, and the answer lies in the fact that the cars owned by one steam railroad may travel for a long time on some other road and must receive repairs in the shops of the latter. "To take hold of this condition this (M. C. B.) association has formulated and maintains rules for the truckage of traffic in so far as they relate to the physical condition of the car, so that the traffic itself may not be delayed." Among the efforts of the M. C. B. association through these interchange rules is "the compulsory use by car owners of detail standards of construction as brought about through the operation of the rules, so that when the association feels that certain standards of construction are necessary for the safe operation of cars, they will not be permitted to be interchanged without the use of said standards." Provision is further made that in the event of a car

being offered to another road for interchange which contains a non-M. C. B. part covered in the rules of interchange, the second road is to replace the part with the M. C. B. standard and bill the parent road for the cost thereof. This gives a compelling reason for the real standardization of parts which have been considered of sufficient importance to be required by the rules of interchange.

A like reason does not exist among electric railways at the present time, as with few exceptions they operate independently, not interchanging with steam railroads or amongst themselves. We must look elsewhere therefore for a justification of the existence of the A. E. R. E. A. standards and for telling arguments for their increased use. This refers of course to the detail construction standards and not to the standard specifications for materials, which will be treated later.

The "acid tests," therefore, of the A. E. R. E. A. standards are the following: (1) Will they provide better and more durable articles than those now in use? (2) Are these articles cheaper than the present ones? (3) Can the standard article be used on present equipment without prohibitive alteration to adjoining parts?

With these queries in mind let us compare the individual A. E. R. E. A. equipment standards with those of the M. C. B. association.

STANDARD DESIGN OF BRAKE SHOES, BRAKE SHOE HEADS AND KEYS

(Engineering Manual, Section Eb 1a)

The M. C. B. freight-car trucks are of sufficient wheelbase, and have wheels of the same character throughout, thus permitting the use of the standard parts without difficulty. Many electric passenger car trucks are of extremely short wheelbase, maximum-traction variety, which gives but very cramped space for the brake shoe and head. The A. E. R. E. A. standard does not, however, specify any particular design of head at the hanger attachment and the general design is sound and one which can be used on most existing trucks. The tendency of the brake-shoe manufacturers, however, is to urge the use of as thick a shoe as possible, and inasmuch as interchange is not a controlling factor, these roads which can do so might be justified in using a shoe of different thickness. It would therefore seem that the A. E. R. E. A. standard design should provide for a variable thickness. The use of the shoe, of course, involves the use of the A. E. R. E. A. standard wheel flange and tread.

The advantages of the use of the standard shoe are that a shoe which will wear evenly is provided and the manufacturer's patterns and steel backs necessary to be kept in stock are reduced in number.

AUTOMATIC COUPLERS FOR INTERURBAN CARS AND RADIAL DRAFT RIGGING

(Section Ec 2b)

This standard is of a "special" character covering those cases where interurban cars interchange with steam railroad cars. It provides for a coupler of the well-known M. C. B. type, with radial attachment.

LOCATION OF END CONNECTIONS ON INTERURBAN CARS ENGAGED IN THE INTERCHANGE OF CARS

(Section Ec 4a)

This standard while desirable is not of compelling interest inasmuch as the interchange is, in general, of local character and easily adjusted by agreement between the interchanging roads.

TAPER FOR BORE OF PINIONS

(Section Ec 10a)

This is a matter strictly in the hands of the pinion manufacturers, as regards new motors and I believe that the recommendation is generally compiled with. For old motors it can be adapted as armature shafts are changed, and this course should be pursued in so far as possible, as it permits the manufacturer to ship from stock, assuring quick delivery and lessened price.

JOURNAL BOXES

(Section Et 1a)

These boxes are designed for the M. C. B. type of journal with collar, which has been adopted as the standard axle of the association. The use of this style axle is by no means universal among electric railways and there are many roads which prefer a properly designed collarless journal with check plate. The great number of short-radius curves of the electric railways with consequent heavy end thrust on the somewhat limited bearing surface presented by the axle collar causes rapid wear and many roads therefore still prefer the check plate type, and in some instances have changed from the collared axle to the collarless type.

For those roads which wish an M. C. B. journal, the boxes are of good design and might well be adopted. This would permit manufacturers to reduce the number of patterns now found necessary and would enable them to make quick delivery and to figure prices closely. It will be noted that the M. C. B. practice is followed of not specifying the type of lid or its attachments, leaving the manufacturer free to design the ribbing and other features of the box in accordance with his best judgment and experience. It therefore appears that the design should be adopted wherever a collar M. C. B. journal is used, but provision should also be made by the association for a check-plate type of box.

JOURNALS AND JOURNAL BEARING KEYS

(Section Et 2a)

The heading given in the Engineering Manual is somewhat misleading, the matter referring rather to journal brasses than the journals themselves. These are copies of the M. C. B. standard brasses, and as such can be used satisfactorily with the type of journal box above described and the M. C. B. type of collar and axle. The actual details shown no longer agrees with the M. C. B. standard, as certain changes have recently been made in the latter and the A. E. R. E. A. standards should be used.

These brasses have the defect mentioned above in discussion of the journal boxes, namely insufficient bearing to resist the end thrust. Furthermore, where the braking power has been pushed up to the limits recommended by the air-brake manufacturers there is a tendency for the brass to ride up around the journal. Some roads have therefore found it desirable to change the shape of the brass. All in all there would not seem to be enough unanimity to warrant the continuation of the journal box and its contained parts as association standards. The fact that the M. C. B. Association has adopted standards for a cer-

tain part does not of necessity prove that that part is susceptible of standardization on electric railways.

AXLES

(Section Et 3a)

As above stated these axles are designed with the M. C. B. collar-type journal and the arguments against its use are already given. Until a substantial agreement is reached as to the relative merits of the two types of bearing, the axle designs should not be included as association standards. All portions of the axle other than the journal collars are as truly matters for standardization, and designers of new equipment and those having trouble with their old designs should use the standards shown.

The commercial advantage of the standard axle is that the manufacturer may reduce his stock of forms and dies and will be familiar with the shipping weight of the axle thus facilitating close figuring in the price quoted. Further advantages are the standards which its use permits in the boring of wheels, motor bearings and gears.

TREAD AND FLANGE OF WHEEL

(Section Et 4a)

No subject has been given more thought and study than that of the wheel flange and tread, and the association standard now presents the agreed best practice. Its use enables way engineers to adopt standard rail sections which simplify the foundry work of the chilled wheel manufacturers. It provides a satisfactory contour and should be adopted generally, and I believe is being very widely used.

ROLLED STEEL WHEELS

(Section Et 7a)

This recommended design covers a part which it is extremely desirable should be made standard, and it is to be considered a matter for congratulation that the equipment committee this year in its report recommended a standard and that the standards committee has approved its recommendation. The resulting tonnage of steel and chilled iron wheels is great and it would greatly facilitate a prompt delivery and reduce manufacturing costs if the association standard wheels are adopted.

CONCLUSION AS TO STANDARD ARTICLES

Reviewing the foregoing notes one may list the equipment standards which appear worthy of general use thus: Brakeshoes, heads and keys (Eb 1a); automatic coupler for interurban cars (Ec 2b); location of end connections on interurban cars (Ec 4a); taper for bore of pinions (Ec 10a); tread and flange of wheel (Et 4a); rolled steel wheels (Et 7a).

These standards which do not seem to have the unanimous support of the association and which therefore should be altered or eliminated are: journal boxes (Et 1a); journal boxes and keys (Et 2a); axles (Et 3a).

The revision of the National Electrical Safety Code, which is being made preparatory to the publication of a new edition, has been nearly completed by the United States Bureau of Standards. Among other items, the rules involving the construction of electric power lines are now governing all outdoor construction will be submitted for under consideration, and soon a revised draft of the rules general criticism. This has been somewhat delayed by a survey of such construction, covering the entire country, which has been carried out in co-operation with the committee of the N. E. L. A.

An Effective Home-Made Grade Indicator

An Extemporized Device Which Was Prepared for Use in Wartime Work Permitted Grades to Be Measured Rapidly

BY CHARLES R. HARTE

Construction Engineer The Connecticut Company, New Haven, Conn.

IN COLLECTING the data regarding electric lines which the American Electric Railway Association furnished the War College, the Connecticut Company found it necessary hastily to determine grades on a considerable mileage of tracks which had been built by predecessor companies, for which plans and profiles were incomplete or in many cases entirely lacking.

The base sheets for the work had been enlarged from the United States Topographic Survey sheets, which are on a scale from 1/62,500 to 1/20,000. It was necessary to locate the beginning and the end of each grade of 3 per cent or over, and to determine its magnitude.

J. B. Whittemore, engineer Shore Line Electric Railway, solved the problem for his track by hanging a carpenter's level in a car window so it could swing in the plane of the glass, marking on the latter a circle 2 ft. in diameter having for its center the pivot on which the level turned, and dividing the circumference, for about 2 in. above and below a horizontal line into hundredths of a foot. By keeping the bubble of the level central, the rate of the grade on which the car was standing or operating could be once read on the scale, one per cent being represented by a division approximately $\frac{1}{8}$ in. long.

With care the grade could be determined with Mr. Whittemore's device within one half of 1 per cent. The Connecticut Company, however, felt that more rapid and more accurate results would be had by the use of a larger scale, and that as the work was to extend over several divisions it was desirable to have the "gradienter" so it could readily be fixed in any car.

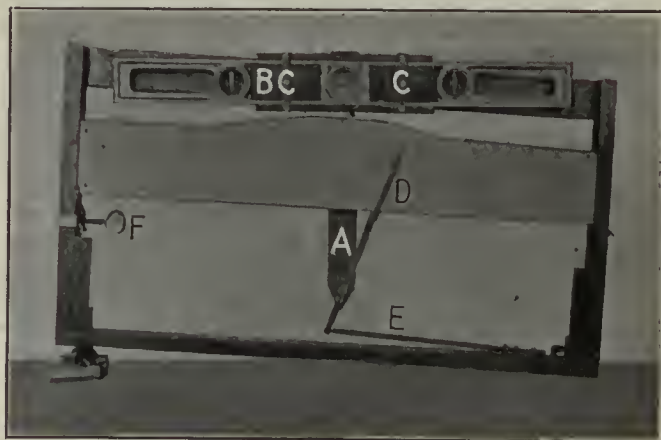
The illustration shows the device as developed. To one end of the steel bar *A*, 2 in. wide, $\frac{1}{8}$ in. thick and 10 in. long, were fastened two wood arms between which the carpenter's level *B* just fitted and was held in place by the straps *CC*, while a screw on the center line and midway between the blocks served as a pivot. The brass needle *D* was pivoted to the lower end of *A* and to the swinging arm *E*, the result of the leverages being that a movement of 0.01 ft. at the end of the level which was just 2 ft. long moved the end of the needle about 1 in., the exact relation varying somewhat in different parts of the scale since the point of the needle does not follow a true circle.

An adjusting screw and nuts from an old skate served to connect the swinging arm to the frame and to allow adjustment, and the scale was graduated by first setting the level parallel to the base, by careful measuring at each end and adjusting the needle to the center of the scale at the same time. The needle was then moved until the end of the level had traveled 0.01 ft., then 0.02, and so up to 0.15, the position of the needle point being marked each time. These points were then checked by moving back by the same steps, while the one half of 1 per cent points were measured directly on the scale, halfway between the points secured by trial.

In service the frame is held in a car window by the clamp *F*, which wedges it into the frame, and the needle is brought to the center mark with the level bubble central when the car is on track which is known to be level. This adjustment is necessary, particularly with older cars, since due to unequal spring strengths the window sills are not always parallel to the track. One man then keeps

the bubble central, by moving the needle, while the observer notes the readings desired—in our case 3 per cent or over—and the points at which the changes occur.

The results made with the device were checked on the return trip, and in the very few instances of disagreement a second test was made. For the war maps, where 1 in. on the sheet represented 1667 actual feet, the grade-ends could probably be located as accurately as they could be plotted, under regular run conditions. However, having in mind the assistance (?) which would be given the men by curious passengers the users of the device deemed it wiser to run a "special." This gave opportunity to locate the grade points more accurately, and to tie them definitely to known reference points such as bridges, roads, curves or the like. When, as often happened, the grade point



GRADE INDICATOR DEVELOPED BY CONNECTICUT COMPANY FOR USE IN EMERGENCY WAR WORK

was some distance away the special could, with due regard to the regular schedule, of course, be held long enough to tape or pace the required interval.

The device proved very satisfactory for the purpose intended. Clamped and adjusted in an automobile or wagon it would serve equally well to determine highway or street grades; with a longer and more sensitive bubble tube the grade could be read to smaller percentage fractions, but of course in such cases particular care would have to be taken to prevent any play in the lever connections. In the arrangement shown machine screws were used in holes just large enough to allow free motion without backlash. These would doubtless soon wear loose if used to any great extent, and for a permanent or more accurate form a spring to hold the pivot against the other parts should be added. However, the simpler form will serve for many purposes, and with the thought that it may help others it is here described.

Vestibuling of Cars Still Going On in Baltimore

THE work of vestibuling 560 double-truck semi-convertible cars by the United Railways & Electric Company of Baltimore, which was started in 1915, is still being carried on. This remodeling of vestibules and the standardizing of other parts were described in the *ELECTRIC RAILWAY JOURNAL* of Aug. 19, 1916, page 302. Much better progress would have been made but for the war, during which the remodeling was suspended on account of the scarcity of material and the shortage of labor. To date 330 cars have been finished, about 60 per cent of the total number to be done. The cost of reconstructing each car now is practically double that of the first cars, due to the great increases in cost of labor and materials which have taken place since the remodeling process started.

Helical Gearing for Railway Motors

Helical Gearing in Railway Motor Construction Was Introduced in Order to Lessen Motor Troubles Caused by Vibration

By W. H. PHILLIPS

Metallurgist R. D. Nuttall Company, Pittsburgh, Pa.

THE spur gear has been standard for years in electric railway motor construction. While it was known that it had certain inherent defects, still the importance of these imperfections was not given much thought and it was assumed that they were of minor importance. With the increasing demand for cheaper operation, manufacturing engineers spent considerable time in trying to improve this field of gearing, and the spur gear, with its vibration, was carefully studied.

For equipment used in the heavier type of traction service, the flexible gear was introduced. This was originally developed by the Westinghouse Electric & Manufacturing Company and has greatly increased the life of this class of railway equipment, and has produced substantial savings in maintenance costs. The life of the gearing has also been materially increased. The flexible gear design, however, is of too expensive a type to warrant its extensive use in city service. So far all attempts to develop a low-price flexible gear that would meet all requirements have been unsuccessful.

VIBRATION CAUSES SPUR-GEAR TROUBLE

The fundamental cause of most of the spur-gear trouble is vibration, and the reason for the successful operation of flexible gearing is its ability to absorb this vibration. The deterioration of the various parts of a railway equipment is directly proportional to vibration. Therefore, if this is eliminated to any extent the life of the equipment is lengthened and noise is reduced.

The helical gear goes back a step farther than the flexible gear, and instead of absorbing the vibration eliminates it. In order to see clearly just how this is done it is necessary to study the cycle performed by a spur-gear tooth in passing through mesh with a pinion tooth, or, in other words, the relation between spur gearing and vibration. A motor in ordinary city service, with a gear ratio of 15 to 69, will have one tooth of the pinion in contact with one gear tooth alone, approximately 35 per cent of the time. During the remainder of the travel of this tooth through the arc of action, there will be two teeth of the pinion in contact with two teeth of the gear. A gear tooth, according to the "Lewis" formula, is loaded as a cantilever beam.

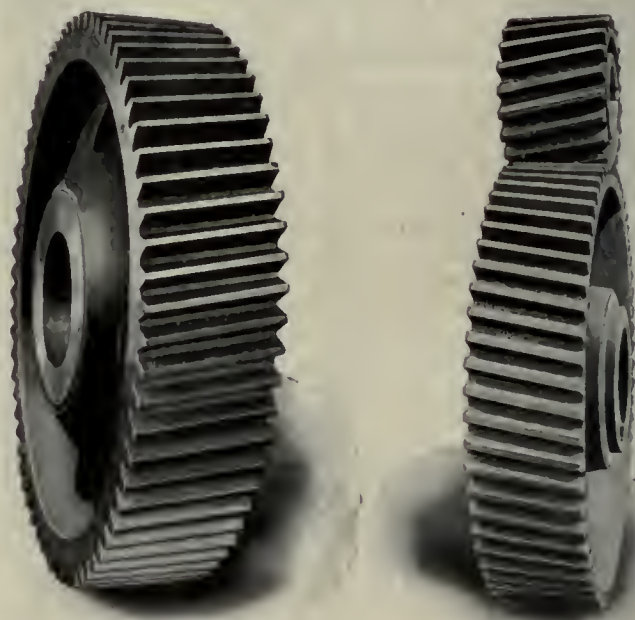
Due to the modulus of elasticity or stretch of the steel within its elastic limit, and which stretch is constant for all steels, whether heat-treated or untreated, this tooth will deflect slightly, as will also the tooth of the gear with which it is in contact. When a pinion tooth first makes contact with a gear tooth, the distance between this pinion tooth and the pinion tooth leading it into mesh is less than the normal pitch by an amount equal to the deflection of the leading tooth. At the same time, the distance between the contacting gear tooth and the gear tooth leading it into mesh is greater than the normal pitch by an amount equal to the deflection of the leading gear tooth; that is, the two deflections noted are added together to produce relative displacement of the contacting gear and pinion teeth, bringing them into contact sooner than this should occur.

It is therefore evident that this premature contact causes impact and vibration in the so-called "stepping-over action" of the spur gears. There are many conditions

that accentuate this vibration, such as misalignment, load fluctuation, wear of teeth, bearing wear, etc.

Every effort has been made to produce material that will resist wear in gearing. The lubrication and proper design of bearings has been studied, and much time and thought have been expended on gear lubricants, some going as far as to mix sawdust in the grease in an endeavor to effect improvement. While much improvement has resulted from these endeavors, still, as the gears grow older, vibration gradually becomes greater, until the gearing has often to be scrapped before it is worn out.

The helical gear accomplishes the results desired by the practical elimination of tooth deflection. If the spur-tooth impact could be divided into an indefinitely large number of infinitely small impacts, the spur-tooth impact would disappear. Consider a spur pinion tooth made up of layers of tin, with each layer advanced slightly ahead of the next one. The impact of each small step as it comes into contact



AT LEFT, HELICAL GEAR DESIGNED FOR RAILWAY MOTORS. AT RIGHT, HELICAL GEAR AND PINION AFTER NEARLY 300,000 CAR-MILES SERVICE

is infinitely small. If now, in order to simplify the construction, we cut the tooth on a slight helix angle, we obtain the tooth meshing with no steps, and therefore a very smooth action. The teeth feed into mesh like a worm gearing. The tooth picks up its load at one end. The contact falls gradually across the face, and before it leaves the other end a second tooth has taken up its share of the load. It can be seen that while there may be slight tooth deflections at the end as it comes into contact, the action is so smooth that no vibration results. Obviously, the elimination of vibration and impact results in the elimination of noise and actual service has shown that a car equipped with helical gears is practically noiseless. While noiseless gearing is undoubtedly desirable, what may be considered as of much more importance in these days of economy is the effect of the elimination of vibration on the other parts of the equipment.

END THRUST OF HELICAL GEARING

As the teeth of helical gearing are cut on a slight helix angle, there is bound to be a slight resultant end thrust. In considering the problem of taking care of this end thrust the capacities of the armature and axle collars on most of the modern railway motors have been studied. Tests have

shown that the end thrust is under 25 lb. per square inch on these bearings, or well within the ability of the bearings to retain an oil film with the motor running in one direction. This load is on the bearings, with the oil film between restraining lateral movement. With spur-gear operation, due to track irregularities and the lack of restraint of lateral motion, the lurching back and forth causes these bearings to slap together, driving the oil from the surfaces. One or two revolutions in this position will be liable to cut the bearing slightly. Actual service tests extending over a period of five years of heavy interurban service show that the wear on the bearings in which helical gears are used is no greater; and probably is less than in the bearings in which spur gears are used.

Experience with herringbone, or double helical gears, as they are ordinarily installed in heavy industrial service, shows that they are incapable of sustaining end thrust and that where end thrust exists serious wear of the gear teeth results. End thrust in this case is of necessity carried on the gear teeth. With helical gears, however, the tooth angle is selected so that end play of the armature is accompanied by screwing of the pinion tooth past the gear tooth with only a frictional resistance, and a very small direct force



COMPARISON OF HELICAL WITH SPUR TYPE PINION

component. Experience has proved conclusively that the end play which is permissible with spur gearing is also permissible with helical gearing, as far as the good of the gear itself is concerned.

The effect of helical gear operation upon the rest of the equipment provides a very interesting study. The deductions which I include are based upon actual experience and are from the opinions of competent operating men. It was formerly considered imperative that there be oscillating motion between the brushes and the commutator of a motor or generator, whether this be accomplished by oscillating devices such as are found on large stationary apparatus or end play of the armature. The use of ball bearings on railway motors has exploded this idea, and there is a strong tendency now to omit the oscillators in stationary apparatus. The commutation on motors equipped with helical gearings is remarkably good, and as one well-known operating man said, with it an old non-interpole motor operates almost as well as a motor of the most modern type. Again, in the case of the armature bearing, it was thought that the end play aided in distributing the oil films and helped the lubrication. With helical gearing it is found that the life of the armature and axle bearings is increased due to the uniform bearing pressures. Obviously, the brushholders and brushes will give much greater life when vibration is eliminated.

The causes to which open circuits in the various motor windings are traceable are very obscure, and only very extensive operation and a careful analysis of service data will justify any definite conclusion. Results to date, however, indicate a material reduction in open circuits coincident with the use of helical gear. Vibration, especially in

aggravated conditions, has a detrimental effect upon insulation, and the elimination of vibration will obviously lengthen its life. The cause of loose punchings has in many cases been traced directly to spur-gear vibration. In the examination of motors with loose punchings the worst condition has been found to exist at the gear end, the trouble becoming progressively less toward the commutator end. Modern motor design has overcome most if not all of this trouble, but the detrimental effect of spur-gear vibration is well illustrated by this former condition. The loosening of all parts, such as axle caps, gear pans, etc., as caused by vibration, will serve to show that by a reduction of this vibration less trouble of this nature should be expected.

This does not mean that the helical gear is a cure-all, and that proper inspection and maintenance can be eliminated. It does mean, however, that it will be possible to lengthen periods between inspection and overhauling on cars equipped with helical gearing. Motors with helical gears have now been in use nearly five years, under widely different operating conditions. The oldest installation has made nearly 300,000 miles on both pinions and gears with little appreciable wear. Since the Nuttall Company formally introduced helical gearing last June, nearly fifty railway companies have made installation of this gearing on a large scale or have made trial applications.

Dead Gas Pockets for Protecting Soot-Cleaner Elements

IN CONNECTION with its research and development work the engineers of the Vulcan Soot Cleaner Company, Du Bois, Pa., has furnished information regarding the protection of soot-cleaner elements by means of so-called "dead gas pockets."

In order fully to protect the soot-cleaner elements in steep-tube boilers, they place a patented deflecting baffle tile, or row of firebrick forming a pocket in which the element is operated, at the bottom of the first pass, as shown in an accompanying illustration. This pocket eliminates the direct scrubbing action of the hot gases. Space is allowed at the bottom of this baffle through which soot and ash will drop during the cleaning process. At the top of the first pass is another dead gas pocket, also patented, in which the second soot-cleaner element is located. This second element rests upon the circulating tubes to the front drum. Contact with the comparatively cool tubes

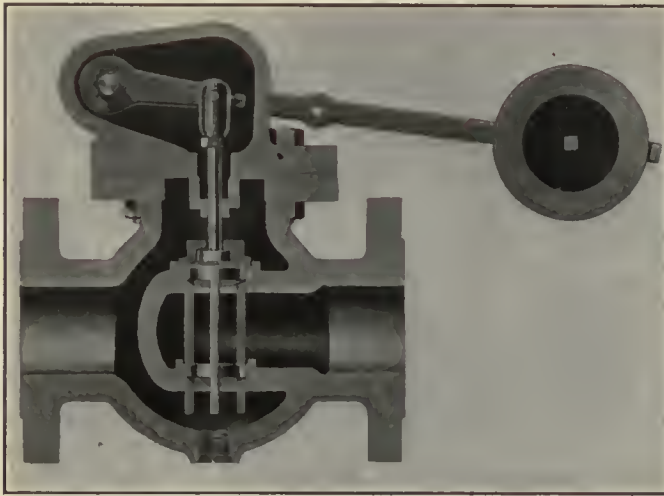


PROTECTION FOR SOOT-CLEANER IN STEEP-TUBE BOILER

assists greatly in maintaining the element at a safe temperature.

By arching the baffle tile over the circulating tubes as shown, the hot gases in their natural flow do not come into direct contact with the element.

In boilers of this type where tubes are arranged in squares, perpendicular nozzles are used. The nozzle makes a right angle with the axis of the element, hence the jet is directed between the tubes and cleans the entire bank of tubes.



CONTROL VALVE WITH HORIZONTAL SHAFT IN PLACE OF RECIPROCATING STUFFING BOXES

New Regulator for Feed Water

IN 1912, the Northern Equipment Company, Erie, Pa., brought out and patented the continuous feed principle of boiler-feed control. This is that water should be fed proportionally to and variably with the load. It involves a variable water level temporarily inversely proportional to the load for gradual increases or decreases in load—with a temporarily decreased feed on a sudden increase in the load and a temporarily increased feed on a sudden decrease in the load.

In the design of the new Copes control valve shown herewith, which the company uses as part of its feed system, the reciprocating stuffing boxes previously used have been abandoned, and in their place there is a horizontal shaft which rotates very slightly, performing the same function as the old reciprocating rod. The frictional resistance has been reduced as much as 6 to 16 lbs. The valve is of the balanced piston type. The weight on the valve lever exerts a constant closing force of 50 lb. on the valve piston. The valve cap or bonnet can be unbolted and removed with fittings attached without removing the valve body from the pipe line.

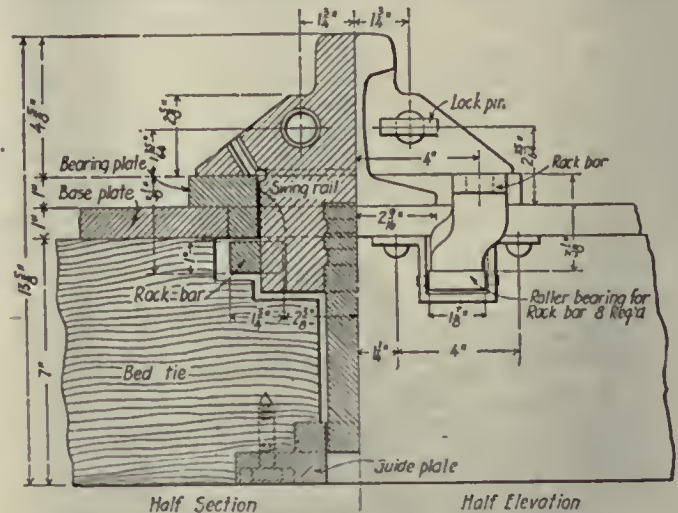
The assembled regulator complete is shown in a second illustration. It consists principally of a heavy expansion tube. This is known as the "thermostat." It is a straight piece of heavy metallic tubing $1\frac{1}{2}$ in. in outside diameter. The top of the thermostat is connected with the steam space of the boiler and the bottom with the water space; hence there is a water level in the thermostat corresponding with the water level in the boiler. It is this water level in the thermostat that determines the rate of feed. The tube lengthens and shortens with drop and rise of water level, the lengthening and shortening being caused by change in temperature of the tube as the water rises and falls. This expansion or contraction of the tube is amplified by means of the link work, and through the link work operates the control valve.



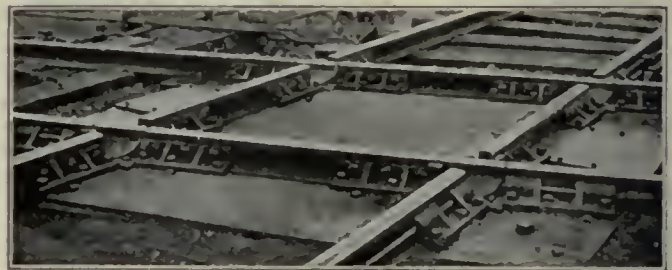
BOILER FEED REGULATOR COMPLETE

New Type of Continuous-Rail Crossing

THE pounding out of railroad crossing frogs and the resulting effect of the vibration on the car equipment as it passes over these crossings are items of exceptional interest to those responsible for railway maintenance. With an idea of reducing these factors the Alexander Railroad Crossing & Equipment Company, Chicago, Ill., is now placing on the market a new type of continuous-rail crossing. This consists of a single steel plate, 1 in. in thickness, on which is mounted a swing rail at the point where the crossing rails intersect. Each swing rail consists of a casting of manganese steel 10 in. in diameter, the top being molded in the form of a rail head, while the bottom part is molded



DETAILS OF CONSTRUCTION OF SWING RAIL AND SUPPORTS



CONTINUOUS-RAIL CROSSING OPERATED FROM INTERLOCKING TOWER

in the form of a pinion. The device is worked by a rack bar, operating upon this pinion. The swing rail works upon a flanged bearing plate, which in turn rests upon the base plate. The swing rails are connected up with the interlocking for the crossing and are operated from an adjacent signal tower. As a precaution against any accidental misadjustment or failure of the parts to work, the usual interlocking devices are operated in connection with the swing rails. The positive locks are worked simultaneously from one lever in the tower.

Novel Annunciators for Fire Sprinkler System

As a Safeguard Against Mistakes in Locating Sprinklers When They Operated, a Duplicate Annunciator with Bells Was Found Necessary

THE three-story carhouse of the Brooklyn Rapid Transit Company for the Bay Ridge section occupies the entire block bounded by Fifty-eight and Fifty-ninth streets and Second and Third Avenues, Brooklyn. This has housing facilities for 635 cars and there are times when the house is filled completely. Extreme precautions against fire are necessary at all times.

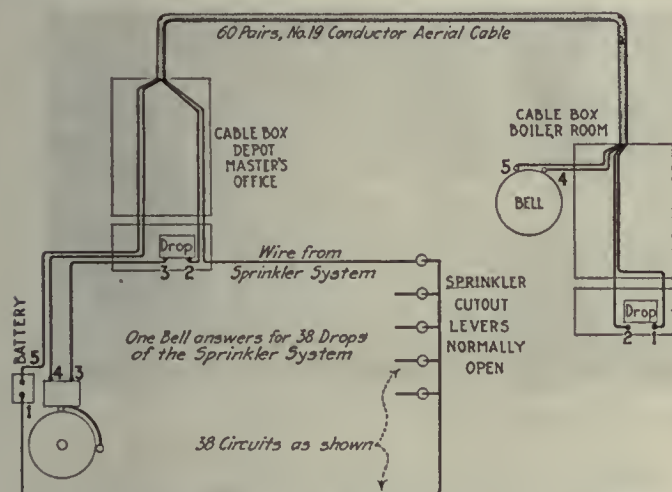


DIAGRAM OF ADDITIONAL ANNUNCIATOR FOR B. R. T. SPRINKLER SYSTEM

Some years ago this carhouse was equipped with a very complete sprinkler system, the installation being made by the General Fire Extinguisher Company. An annunciator of fifty-two drops, with the usual bells was set up in the main office of the depot master at Fifty-eighth Street and Third Avenue. Later it was decided to equip the quarters of the engineer located at the corner of Fifty-eighth Street and Second Avenue with a duplicate annunciator and bells to work in conjunction with the equipment in the depot master's office. The object of this was to avoid the possibility of mistakes in telephoning the location when sprinklers opened.

The additional annunciator in the engineer's office differs from the one originally installed, which is of the standard type, in that each drop has an incoming and an outgoing binding post instead of having the outgoing posts of each drop connected to a common return. A sixty-pair cable, consisting of No. 19 B. & S. conductors, is used to connect the two annunciators, and this cable is terminated in a cable box directly above each annunciator. The wires are brought to separate binding posts and each circuit is labeled. All sprinkler contacts are normally open.

The accompanying diagram shows a representative circuit; the principle of operation of the other thirty-seven being the same. When the circuit is closed at the sprinkler, one lead runs directly to one side of the battery while the other can be traced as follows: Sprinkler to the annunciator drop in the engineer's room, to the drop in the depot master's office, to the bell in the same office, to the bell in the boiler room and then back to the other side of the battery. When the sprinkler contacts close, due to fire or otherwise, the annunciator drops at both locations will register, and also the bells at each location will ring continuously. In the engineer's office there is a 5-in. 11-ohm

bell and in the depot master's office there is a 7-in. 10-ohm vibrating bell.

The resistance of the additional annunciator which was installed in the engineer's room measures about 14 ohms. The system formerly required one set of dry batteries, consisting of seven cells in series, but to overcome the additional resistance, due to the additional annunciator, there was added four sets of dry batteries in series, each set having five batteries in parallel.

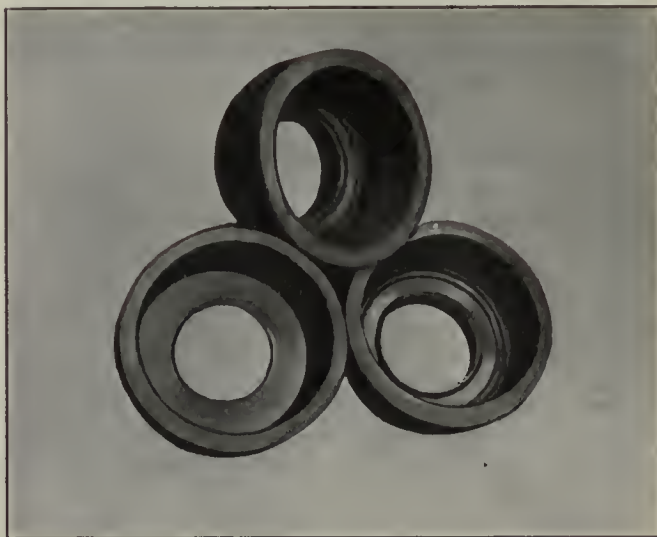
The installation of this additional equipment was done by the electric line department of the company, which department has charge of the maintenance and construction of its extensive fire alarm system.

Reclaiming Worn Armature Dust Collars

DUST collars on the gear end of the motor armature axle are subject to severe wear on the inside surface and also to some wear around the axle. On the Tri-city Railway, Davenport, Iowa, it was formerly the practice to scrap these collars when they became excessively worn and to purchase new ones for about \$2.50 each. At the present time the worn collars are being reclaimed at a cost of about \$1 each.

When the collar is badly worn on the inside surface and is also loose on the axle, the first step in reclamation is to heat the collar up to a red heat and then cool it in moderately cool water. The collar is not completely immersed in the water and then the collar is slowly revolved by means of a pair of tongs. By this method the part of the collar surrounding the axle can be shrunk about 0.01 in. in diameter.

The second step is to smooth up the worn surface by taking out a cut on the lathe and then to rivet in place



THREE STAGES IN DUST COLLAR RECLAMATION

Collar at right shows badly-worn surface as taken from armature axle. Collar above in same condition but has been shrunk. Collar at left has new wearing surface and is ready for reinstallation.

on this wearing surface a $\frac{3}{8}$ -in. ring. The rings are cut from the end of an old axle. This surface is again turned down until the proper thickness is secured and the axle opening is then drilled out to exact diameter. Some collars that need new wearing surfaces do not need to be shrunk, in which case the cost of reclaiming is proportionately reduced.

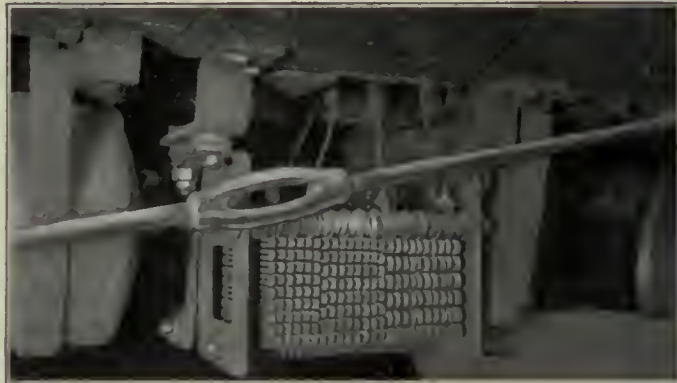
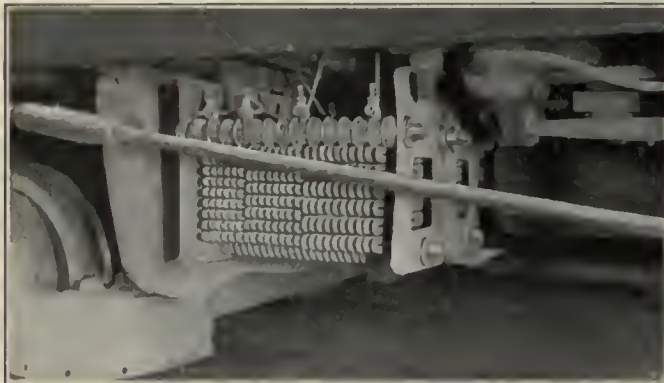
Engineering Council is urging the appointment on the new Industrial Conference of two or more engineers familiar with industrial problems.

Lowering Grid Resistors to Provide Increased Ventilation

ON THE double-truck closed cars of the Brooklyn Rapid Transit Company, the grid resistors are installed in a location between the end of the main reservoir and the truck. In order to prevent wheel wash from short circuiting the different grids, it has been necessary to install a shield between the end of the resistor frame and the truck. When this type of resistor was first installed on these cars, there were no air brakes and consequently no main reservoirs to interfere with the circulation of the air. The installation of the air-brake equipment placed the grid resistors in a sort of pocket and trouble from overheating resulted in numerous cases. In order to provide increased ventilation for the resistors the company is now lowering

brakeshoe pressure before a temperature would be reached which would cause excessive wearing away of the shoes. On the other hand, in freight service, where it is necessary to make long applications of the brakes when descending grades or reducing speed, this is usually accomplished with a comparatively light brakeshoe pressure; but the period of application is so long that very high brakeshoe temperatures are reached and the resulting wear is necessarily very rapid. To illustrate this principle, this engineer referred to a man pouring water from a pail into a barrel through the bung hole. If a stream slightly smaller than the diameter of the hole is used the water can be poured in without waste, but if an attempt was made to force the flow much of the water will be spilled.

In this connection there is another point which should be taken into consideration, namely, that the brakeshoes



GRID RESISTORS BEFORE AND AFTER LOWERING

them a distance of 4 in. The same insulators and method of supporting are used, but a flat iron support is bolted to the car members with an offset, so that the supporting face provides for the necessary lowering of the grid frame. The accompanying illustrations show the grid resistors before and after the change has been made.

Causes of Brakeshoe Wear

IN A COMPANY publication* a question was recently asked regarding brakeshoe wear. This question was: "Will brakeshoes wear away faster when operated with a high braking pressure which requires but half the distance to make a stop or with half this pressure and twice the braking distance?" As an example, suppose a 400-lb. brakeshoe pressure will stop a car in 1000 ft., will the shoes wear faster with this operation, or when an 800-lb. brakeshoe pressure is used to make a stop in 500 ft.? In answer to this question, M. F. Skouden, superintendent of motive power Union Traction Company of Indiana, stated that the wear of brakeshoes is determined by the resulting temperature rise. If the coefficient of friction becomes great enough from rapid rise of temperature the surfaces will, in his opinion, wear much faster. He concludes, therefore, that with high brakeshoe pressure there would be a more rapid rise in temperature and a more rapid grinding away of the brakeshoes.

This question was referred by the ELECTRIC RAILWAY JOURNAL to a prominent engineer connected with a brakeshoe manufacturing concern. He stated that the wear is faster at higher temperatures, but that the temperature obtained depends more on the character of the service than upon the brakeshoe pressure and length of stop. A brakeshoe consists of quite a large volume of metal. This can absorb heat only at a certain definite rate, and under certain conditions it might be possible to stop a car with a high

make contact only in spots and, of course, the smaller the areas of these spots the quicker will heating take place. If the metal of the brakeshoe adjacent to these spots of contact cannot conduct the heat away at a sufficiently high rate, the spots will reach excessive temperatures and will wear away rapidly. It thus appears that an accurate and complete answer to the question can be arrived at only from tests.

It is suggested that anyone having data on this subject available could do the industry good service by sending them, in brief form, to this paper for publication.

Gas vs. Gasoline for Motor Vehicles

A REPORT of the inter-departmental committee on the employment of gas as a source of power in motor vehicles is discussed in *London Engineering* for Aug. 15. It is stated that gas performed a very useful function in the war, but since then has apparently dropped out of use due possibly to the decrease in the coal supply. This report gives an example of the use of gas by the Griscom Street Tramways, which estimated that for every 1000 miles run on gas a saving of nearly \$3.75 was made as compared with gasoline. A large part of the gas used had not been debenzolized, and about 240 cu. ft. of gas was to be equivalent to a gallon of gasoline.

The possibility of using steel cylinders for the flexible containers previously used gives an entirely new aspect to this question. The committee recommends that gas be stored at high pressure in steel cylinders and favors a semi-rigid container consisting of an inner member or tube in the form of a rubber container and an outer casing of woven steel wire. This class of container is approximately one-third the weight of a steel container for a given volume of gas, and as it stretches on being charged, it gives ample warning of over-charging. A working pressure of 45 atmospheres is recommended.

* *Safety*, published monthly by Union Traction Company of Indiana.

Steel Pilots for All-Year Service

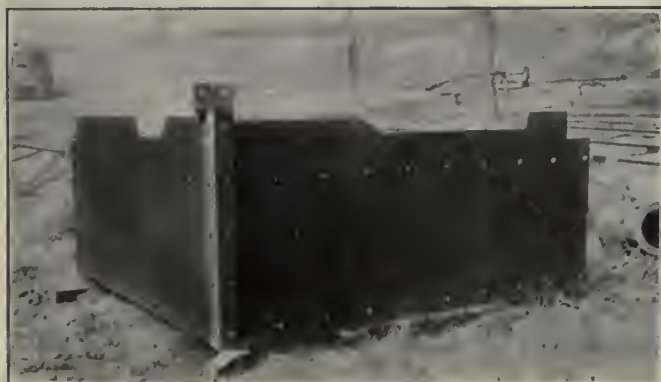
Interurban Company Equips All Motor Cars With Solid Pilots for Protection of Motors and for Service as Snow Plows

THE Winona Interurban Railway, Warsaw, Ind., has equipped all of its interurban motor cars with steel pilots for all-year service. Wood-slat pilots were formerly used, but these were constantly in need of repair. The steel pilots not only protect the motors at all time but also serve as snow plows in the winter.



MOTOR CAR EQUIPPED WITH STEEL PILOT

The construction of the plows is clearly shown in the accompanying illustrations. No. 10 gage steel is used and the horizontal reinforcing angles are 3 in. x 3 in. top and bottom. The angle at the point of the plow is also 3 in. x 3 in. and this is bolted to the bumper, suspending the front of the plow therefrom. The frame at the rear, which is bolted to and supports the rear of the plow from the forward longitudinal sill, is made up of 1½-in. x ½-in. strap iron vertical and cross bracing and 2-in. x 2-in. horizontal angles. As additional bracing against shock a 3-in. x 3-in. angle extends from the lower forward point of the



TOP OF STEEL PLATE IS CUT TO FIT UP CLOSE TO CAR FLOOR

pilot to the forward longitudinal car sill which is a 5-in. x 3½-in. angle. All work is bolted together, no riveting or welding being employed.

Using Electric Lights to Replace Oil Tail-Lights

IN ORDER to eliminate the troublesome oil tail-light the Harrisburg Railway has equipped one of its suburban cars with two small battery lamps. These are red lights, such as are usually used for tail-lights of automobiles, and the current is supplied from a 40-amp. storage battery. In order to keep the battery charged it is floated across the line through one of the car-lighting circuits, which has five 23-watt Mazda lamps. So far no trouble of any kind has been experienced, although the car has been in operation over a year. The battery has given no trouble, and the only maintenance necessary so far has been to add distilled water to the cells. The accompanying diagram shows the method of connecting the tail-light and the method of keeping the battery charged.

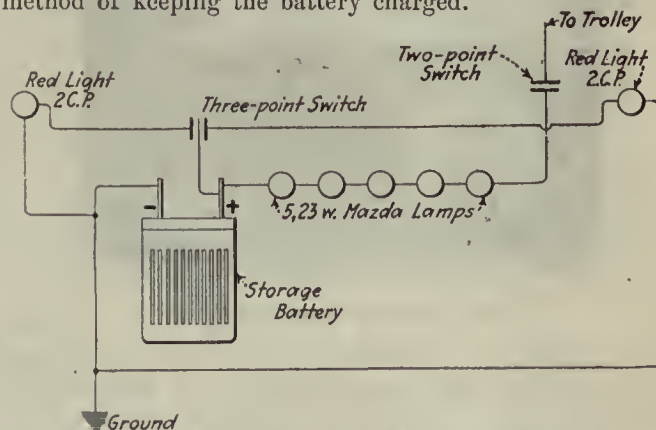
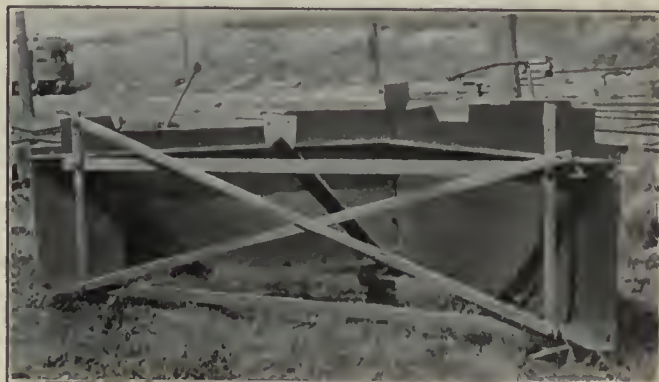


DIAGRAM OF CONNECTIONS FOR ELECTRIC TAIL-LIGHTS

[NOTE—There seems to be an opinion among railway men that there is a certain hazard in the use of electric tail-lights. The New York Municipal Railway has used electric lights for head, tail and marker lights on its subway cars for the past four years, but supplements these by hanging an oil lantern at the rear of each train. The idea is that there is an element of danger in the use of electric lamps for tail-lights as they might become extinguished and lead to serious accident. A double-filament lamp of a type commonly used in electric signal installations is used on these cars, which reduces the hazard from broken filaments. Other installations have used two lamps in parallel, one of which has a high resistance in series, so that ordinarily this lamp is not lighted, but in case the other lamp becomes open-circuited, this lamp lights up.—Eds.]



PILOT IS STURDILY CONSTRUCTED AND BRACED AGAINST SHOCK

Portable Foot-Candle Meter

**Illumination Intensity of the Light at Any Point
Can Be Read at a Glance**

IN ITS EXHIBITS at the recent convention of the American Electric Railway Association at Atlantic City the General Electric Company showed a new portable foot-candle meter for general photometric use. This was developed to meet the demand of electric railways for a light, compact, non-complicated instrument which would measure the illumination intensities commonly found. No special skill is required to operate the instrument, and as it is light and compact it can be carried anywhere and read-



PORTABLE FOOT CANDLE METER

ings can be taken in the same manner as with a large photometer and with sufficient accuracy to be of real practical value.

The basic principle on which the foot-candle meter operates is the same as that employed in the photometer. The screen on which the reading is taken consists of a piece of a clear glass on which are two thicknesses of paper. One contains round holes fairly opaque, and the other spots which are highly translucent. This screen forms one side of the light box which is so constructed that the screen is illuminated from within to a much higher intensity at the right end than at the left. The exposed side of the screen is very nearly uniformly lighted and the round spots appear brighter than the surrounding screen at the right end and darker at the left, as shown in the accompanying illustration. At the point where the spots change from brighter than the background to darker, the illumination on both sides of the screen is approximately the same. The illumination intensity thus indicated may be read without any difficulty whatever.



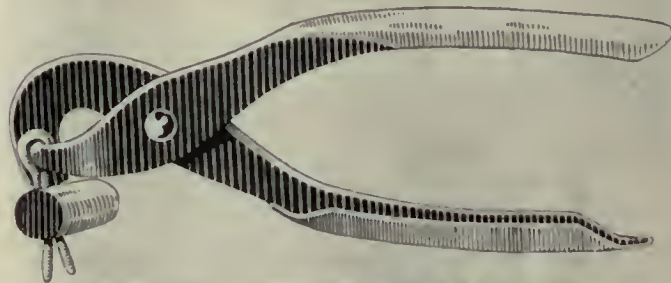
SCREEN OF METER INDICATING A LIGHT INTENSITY OF 5.5 FOOT-CANDLES

As the light supplied to the screen from within comes from a small electric light it is obviously important that, after the foot-candle meter has been calibrated, the light supply be kept constant. To effect this a rheostat or adjustable resistance is connected in series with the lamp and the battery. This permits the voltage applied to the lamp

to be maintained at a constant value. A small voltmeter, which is a part of the instrument, shows the voltage supplied to the lamp. An arrow is placed on the voltmeter scale and as long as the voltmeter needle is directly over the arrow the lamp is operating at the correct voltage to supply the proper illumination to the photometric screen. There is another mark on the voltmeter scale, labeled 1/10, which is so located as to make the scale read ten times the illumination measured. This is useful for measuring low values of illumination which are not reached by the direct-reading scale.

Convenient Tool for Extracting Cotter Pins

THE removing of cotter pins is often a difficult job to the shopman, particularly when these are so located as not to be readily accessible. The tools most used for removing cotter pins are hammer and cold chisel, but there are many locations where a hammer cannot be used and the use of the cold chisel frequently damages the cotter pin to such an extent that it is worthless for further use.



EXTRACTING A COTTER PIN WITH SPECIAL PLIERS

The accompanying illustration shows a tool for removing cotter pins which has been given publicity by the *Scientific American*. The device is of the same size as an ordinary pair of pliers. One tong of the pliers engages the pin while the other uses all of the leverage exerted against the member through which the pin is inserted. As this leverage is four times as great as the actual force used the pin comes out quickly and easily.

New Portable Utility Light

A NEW TYPE of night lamp for localized lighting has recently been placed on the market by the Western Electric Company. It is known as the "Portable Utility Light," and is for use at close range where the lamp is to be located at distances not greater than 125 ft. from the object or surface to be illuminated. With the light operating on a 100-ft. throw, a 100-ft. spread is obtained at an angle of 60 deg. The hammered glass reflector is spring suspended in a one-piece cast-iron housing. The housing is closed by a wire glass front which is at the bottom and secured by a hand latch. The lighting unit is 19½ in. high and weighs approximately 30 lb. The base is 9 in. in diameter. The unit can also be mounted on either vertical or flat surfaces, such as walls, poles or roofs, by means of a heavy universal joint which fastens the housing to the base. In railway work this light can be used for lighting transfer tables, coaling stations, inspection pits, loading platforms, cranes, drawbridges, loading operations, shop yards, material yards, coal yards, erecting shops, machine shops, conveyors and all kinds of emergency work.



PORTABLE UTILITY LAMP

New Safety Motor Starting Switch

A NEW type of motor starting switch has just been placed on the market by the Westinghouse Electric & Manufacturing Company. It is designed for use with single-phase or polyphase alternating-current motors of from 1 to 10 hp., 250 and 500 volts, and connects these motors directly to the line without the use of the auto-transformers or resistance commonly used. The mechanism is inclosed in a steel box but the protective devices are easily accessible on opening a door in the cover. As a special precaution the box is arranged so that this door cannot be opened except with the switch in its open position, nor can the switch be closed with the door open.



INTERIOR OF SAFETY STARTING SWITCH

No-voltage protection to the motor is provided by a magnetic release which opens the switch automatically on a failure of voltage. Overload protection is provided by means of relays resembling cartridge fuses in appearance, each of which contains a contact connected in series with the release magnet. The entire mechanism is mounted on a slate base and can be removed as a unit without disturbing the box or the conduits.

Improvement in Pole-Pulling Jacks

Templeton, Kenly & Company, Ltd., Chicago, Ill., manufacturers of the Simplex car and track jacks, have recently improved their pole-pulling jacks by making the lowering



USING A JACK TO RAISE A POLE

mechanism a gradually controlled one instead of the tripping arrangement formerly used. The method of control is now the same for lowering and raising. The accompanying illustration shows the method of using this jack to pull a pole.

The National Safety Council has issued a complete bulletin catalog, consisting principally of small reproductions of its posters. More than 1000 illustrations are shown. There are 135 posters in the electric railway section alone.

Automatic Ticket-Selling Machine

AT THE RECENT electrical show held in New York City, the National Sales Machine Company, New York City, exhibited one of its new model ticket-selling machines. Where it is desired to sell tickets of a single denomination automatically, the machines are arranged to receive coins of any denomination up to and including 50 cents. To obtain a ticket, the coin is put in its proper slot and a ticket together with the correct change is delivered. Defective coins are returned to the delivery tray.

For uses in which it is desirable to have a printed record made on the ticket, suitable provision is made in the machine, so that the date, time, or additional information, such as point of issue, number of zone, etc., will be printed on the ticket as it is issued.



AUTOMATIC ELECTRIC TICKET-SELLING MACHINE

A feature of the machine is the coin detector arranged to reject spurious coins, worn coins or slugs whenever they are offered for payment in the machine. The slot will receive the coin, but the coin detector refuses to accept it in payment, and it is promptly returned to the reject slot. The coin detector takes account of all the particular governmental markings on the various coins by means of a series of points which bear on both sides of the coin as it is received. Any pieces of metal not bearing the required markings will be automatically rejected. These machines are operated by small electric motors and the current necessary for operation may be supplied from any lighting fixture that is convenient.

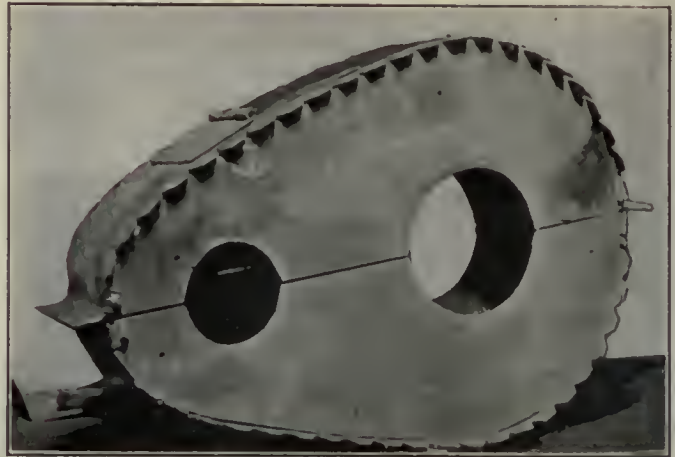
Preventing Punch-Press Accidents

In a recent bulletin of the National Safety Council reference was made to some accidents which occurred on small punch presses in spite of the fact that they were equipped with approved safeguards. Vibration of the building or the falling of a heavy object would cause the presses to repeat while the guard was up. Investigation showed that the trouble was the result of a slight burr on the dog or latch of the press. Acting on these results, the management of the factory instituted a regular weekly inspection of all power presses. Any dogs or latches giving indication of the presence of a burr were immediately polished. This did away with accidents.

While undoubtedly this is a special case the principle of applying systematic inspection methods with regard to machine tools of all kinds is to be commended. An inspector becomes expert in detecting incipient causes of trouble which might possibly escape the notice of the regular operator.



HALF OF GEAR CASE ASSEMBLED WITH ANGLE REINFORCING PLATES IN PLACE



BOTH HALVES OF GEAR CASE ASSEMBLED AND READY FOR WELDING

Gear Cases Electrically Welded

THE Winona Interurban Railway, Warsaw, Ind., is making its own gear cases, using $\frac{3}{8}$ -in. sheet steel and an electric welder. No rivets or bolts are employed in the furnished product.

The side pieces are cut out in the usual form. The strips which hold the two sides together are, however, more complicated in design. Each is made from a strip 52 in. long and 8½ in. wide. Along each side of this strip, $\frac{1}{8}$ in. from the edge and beginning 4½ in. from one end, twenty-three holes each $\frac{1}{8}$ in. in diameter are drilled 2 in. apart. With each of these holes as a vertex a V-segment is cut out with a hand chisel.

The parts are assembled as shown in the accompanying illustrations and temporarily held together by four bolts in each half. With a block inserted to give firm support, the fingers are bent over and welded to the sides with an Erico welder. The ends are bent up in line with the center axis of the case and an angle-plate reinforcing is welded at each end. A complete gear case can be welded up in about two hours.

More than twenty cases have been constructed in this manner and those now in use are giving excellent service. These cases are made up at odd times.

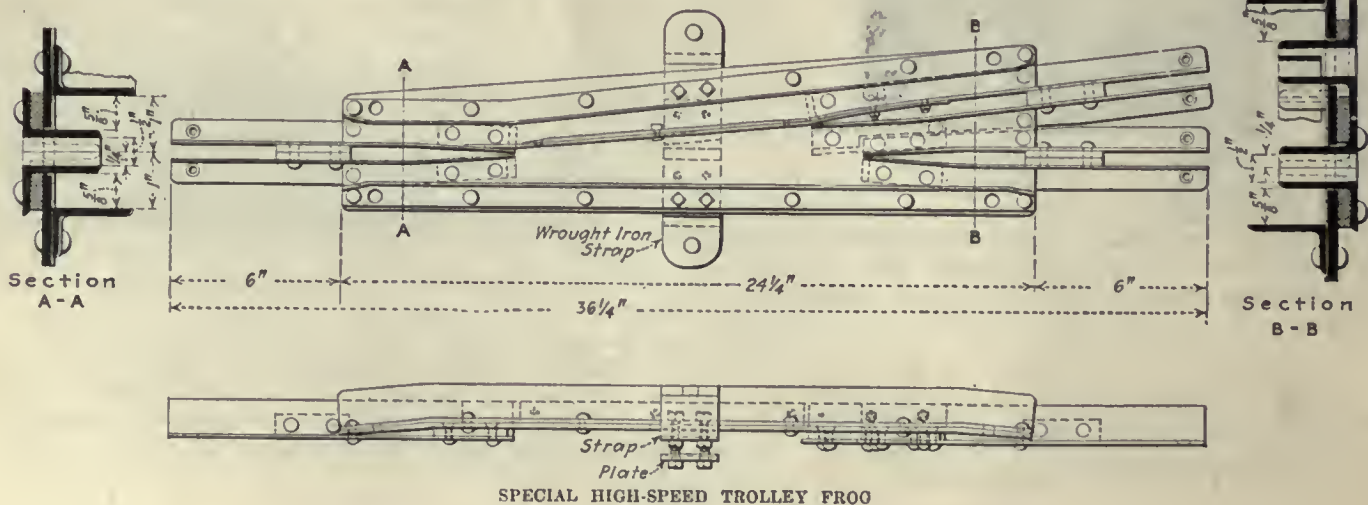
The one-hundredth anniversary of the death of James Watt, the inventor of the steam engine, was fittingly celebrated in Great Britain, particularly at Birmingham, England, a few weeks after the centenary date, Aug. 19. By way of a memorial it is proposed to endow a professorship of engineering to promote research in the fundamental

principles underlying the production of power and the study of the conservation of the national sources of energy, to erect a memorial building and to publish a memorial volume.

Home-Made High-Speed Trolley Frogs

IN CONNECTION with the article on page 566 of the ELECTRIC RAILWAY JOURNAL for Sept. 20, 1919, showing method of making spring switches from the standard trolley frogs, M. B. Rosevear, superintendent of distribution Public Service Railway, Newark, N. J., has called attention to the method which has been in use on his property for some years and which apparently accomplishes the same results in a simpler and less expensive manner. This consists in fastening a flat steel spring to the side of the runway underneath the casting so as to form a guide for the trolley wheel. The flat spring can be fastened by drilling and tapping four holes. This method was described in the issue of this paper for Oct. 7, 1911, page 591. A modification in the material used for the spring has recently been made. Formerly phosphor bronze springs were used, but now the railway has adopted steel springs because they last longer and give better results.

The accompanying illustration shows the assembly for a special high-speed trolley frog which is also being made in the shops of the Public Service Railway. This consists of a heavy rolled-steel plate to which angle irons are riveted for guides and runways. To insure that the trolley wheel will follow the proper wire, a reinforced flat spring is used. Cars operate successfully under this frog at rates of speed as high as from 30 to 40 m. p. h.



Letter to the Editors

The Principle of Differential Wages in Awards

THE ELECTRIC SUPPLY COMPANY OF VICTORIA, LTD.

BALLARAT, AUSTRALIA, Aug. 25, 1919.

To the Editors:

I see from various issues of your valuable journal that the question of differential wages has been exercising many of your undertakings during the recent general demand for increased wages. The officials of the Kansas City Railways made a strong defence in this direction before the National War Labor Board. It may be of interest, therefore, to your readers to have some particulars of how this matter is dealt with in Australia.

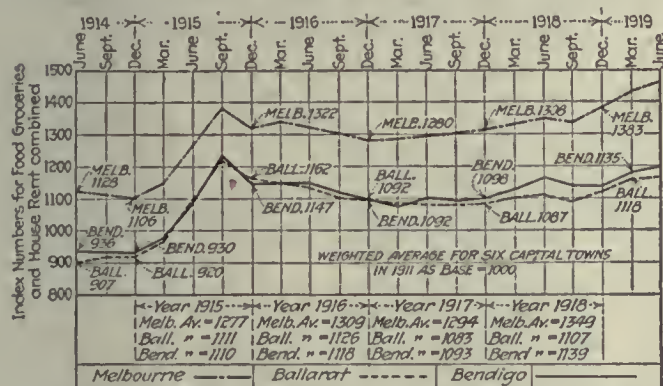
Coming from the old country some eight years ago, where differential wages dependent upon the local conditions and cost of living are generally recognized between the unions and the employers, I was much surprised to find that here wages were being awarded by the various industrial courts on a fixed standard with only one exception, which was

balance of expenditure. Much evidence in regard to this balance has frequently been brought before the courts, and they assume that this is subject to approximately the same increase as the 60 per cent. On this basis Melbourne's cost of living for the June quarter of this year has increased 35.5 per cent over pre-war times, the Federal Arbitration Court now awarding a basic wage of 66s. a week of forty-eight hours. The cost of living figures for Ballarat and Bendigo are now 19.8 per cent and 17.7 per cent respectively lower than Melbourne.

The high peak shown in September, 1915, is due to the effects of the war combined with drought. The cost of living for our country towns then came very much nearer Melbourne's, owing to many of our food costs increasing above the Melbourne standard. This was because many local supplies were cut off by the drought and had to be imported from other states. As Ballarat is 75 miles, and Bendigo 100 miles from Melbourne, extra freight charges above Melbourne had to be met. Food and groceries are now, as normally, a little cheaper in both of our towns than in Melbourne, but the main difference is due to house rents.

The differentiation in wages allowed to our towns, compared, with Melbourne, varies in Federal awards from 6s. to 10s.6d. per week per man less.

P. J. PRINGLE,
Chief Engineer and General Manager.



COST OF FOOD, GROCERIES AND HOUSE RENT COMBINED IN MELBOURNE, BALLARAT AND BENDIGO, THE WEIGHTED AVERAGE OF SIX CAPITAL TOWNS IN 1911 TAKEN AS 1000.

the following: If a state as a whole had higher cost of living than another, then differential wages would be found in federal awards.

For instance, in West Australia the cost of living was notoriously higher than in Victoria, and the former would in consequence have wages awarded from 10 per cent to 15 per cent higher. There was, however, no attempt to differentiate between one town or district in a state, yet in the capital cities the cost of living is much higher and this fact should receive consideration in wage awards.

As the undertakings which I control are in inland towns away from the capital cities, this principle has been of great importance to us. I have been the pioneer of this principle of differential wages in both the Federal Arbitration Court and in the various state awards, and it has become an accepted principle in all arbitration court awards and in many state awards for the last six or seven years.

I append copy of a curve dealing with food, groceries, (forty-six commodities) and house rent combined, which I prepared prior to the war and have kept up to date since. This shows the fluctuations in the cost of living between Melbourne and the towns of Ballarat and Bendigo, in which we operate electric light, power and tramway undertakings. Food, groceries and rent represent approximately 60 per cent of a worker's expenditure. The commonwealth statistician makes no similar inquiry into the

Association News

Work of Committee of One Hundred Summarized

L. S. STORRS, chairman of the sub-committee on information and service of the committee of one hundred, has issued a summary of the work of the committee and has sent to all electric railways reprints of the progress reports presented at the Atlantic City convention.

Mr. Storrs says in substance that the committee:

1. Brought together about fifty leading railway executives, manufacturers, engineers, bankers and economists who presented the case for the electric railway industry to the members of the Federal Electric Railways Commission in a series of hearings held in Washington and extending for a period of more than two weeks.

- 2a. Organized a bureau of information and service which prepared daily abstracts of the testimony submitted and mailed 60,000 copies the same night to companies, public authorities, organizations and associations in every part of the United States.

- 2b. Prepared daily news stories of the hearings for the press with the result that the Associated Press carried from 800 to 2000 words daily in 1100 newspapers; the United Press from 400 to 800 words in 750 papers; the International News Service from 500 to 2500 words in 300 papers; and innumerable special stories were sent out by 300 special correspondents located at Washington.

- 2c. Prepared special pamphlets, bulletins, reports and window card advertisements for electric railway companies.

An expert compilation of the aggregate space obtained in the newspapers as proved by clippings actually returned to the Washington office, shows that \$1,000,000 worth of publicity was given to the railways, measured on the basis of actual advertising rates.

3. The committee's counsel is now preparing a brief covering the case of the railways, which will probably be completed and made public about Dec. 1.

4. As soon as the Federal Electric Railways Commission issues its report at least 50,000 copies will be distributed. Simultaneously the printing of the entire testimony and the report will be undertaken.

5. The work of the committee of one hundred has already resulted in demonstrating that the problem of the electric railways is a national one, that the situation of the railway com-

panies is a matter of importance to every individual, and that a readjustment of relations between the companies and the public is essential to the public interest. A broad foundation has been laid for the companies to complete a similar campaign locally whenever their interests require it at any time within the next decade.

On Nov. 24, Bentley W. Warren, counsel for the Committee of One Hundred, in his presentation of case of the electric railways before the Federal Electric Railways Commission, filed his argument and brief on the testimony submitted. The brief occupies 153 printed pages, and its cover shows that Edwin Gruhl, A. S. Hills, and Harlow G. Clark assisted in its preparation.

Besides a short foreword and introductory statement, the document is divided into five parts. The first of these is entitled "Argument and Brief." This is followed by a statement of the historical development of the street railway industry, occupying thirty-eight pages. The next chapter is a brief one on "Present Condition of the Industry." This is followed by a longer chapter on the causes of the present condition, and this by the final chapter entitled "Fundamentals Underlying the Solution of the Problem." There is an appendix giving the identification of the witnesses.

Safety Car Motion Picture

SECRETARY Burritt of the Association in a letter to member companies under date of Nov. 17, 1919, advised that a number of reels of the motion picture depicting the operation of the safety car, which aroused so much interest at the recent Atlantic City convention, had been made for the use of electric railway companies. Under arrangements with the Universal Film Company a copy of the film has been placed in the Film Exchange maintained by that company in Atlanta, Boston, Chicago, Dallas, New York City, Omaha, Philadelphia, St. Louis, San Francisco, and Seattle, Wash., and can be secured upon application. Companies contemplating the installation of safety cars will find it helpful to have this film shown in local motion picture houses, prior to actual installation of the cars. Arrangements can also be made with the exchange to show the picture to special parties of public officials without extra expense except for the operator's time.

Mr. Dunham Elected President at New Haven

THE thirty-second and annual meeting of the Connecticut Company section was held at New Haven on Nov. 24 with ninety-nine members and guests in attendance. Dinner was served at the Hotel Garde, and after dinner the program was opened by Congressman John Q. Tilson, who congratulated the officers and employees of the company for so successfully preserving intact the transportation system through the war period. President L. S. Storrs then thanked all employees for their interest and efforts in inaugurating the zone system, and he called attention to the importance of all employees putting greater thought into the improvement of public service.

The next speaker was H. C. Eddy, senior traffic inspector New Jersey Board of Public Utilities Commissioners, who gave a historical lecture on the development of electric transportation equipment, illustrated with lantern slides. A model of the original Vandepoele motor, the first used in this country for transporting freight, was shown, and F. L. Beardsley, superintendent of the company's New Britain division, who had operated the original motor in 1888, demonstrated its construction.

The following officers for the coming year were then elected: President, W. R. Dunham, Jr.; vice-president, J. W. Colton; secretary (re-elected), C. K. Savery; treasurer, G. H. Crosson; director for three years, F. A. Hewitt.

Resolution for Consideration at Cleveland

SUPPLEMENTING the preliminary note regarding the program of the mid-winter conference which is to be held at Cleveland in Jan. 8, 1919, the following text of the resolution to be introduced and supported by Williston Fish, vice-president West Penn Railways, is given:

Resolved, That the American Electric Railway Association recommend to its member companies that they provide in their accounting practice for the creation of adequate reserves to insure the replacement or abandonment of major items of property in advance of their actual replacement or abandonment; that such reserve shall, if possible, be provided for in cost-of-service franchises; and further that this subject be referred to an appropriate joint committee of the American Electric Railway Accounting Association and American Electric Railway Engineering Association, to formulate report on the preferable means of creating such replacement reserve and the variations in the amount thereof that will occur in railway properties of different characteristics; and be it further

Resolved, That a summary of such report be presented to the American Electric Railway Association at its annual convention in 1920.

An analysis of the records of the American Electric Railway Association giving an up-to-date list of companies now operating or about to operate one-man cars shows a total of 2409 cars, of which 6 per cent are safety cars.

Railroad Association Adopts Overhead Crossing Specifications Revision

AT ITS MEETING held in Chicago the American Railroad Association adopted, on Nov. 19, a report of its general committee of Section 2—Engineering, on behalf of the electrical division.

The report consisted of three parts: (1) On regulations of the electrical division; (2) a list of officers of the electrical division, and (3) railroad specification for electric light, power supply and trolley lines crossing steam and electric railways; originally adopted May 15, 1912 and previously amended Nov. 18, 1914.

The electric division includes those connected in official or supervisory capacities with the application of electricity to railroad service. Affiliated members may be appointed by the committee of direction. The committee of direction consists of nine representatives of members within the division, including the chairman and vice-chairman of the division, to be selected by the general committee of Section 2—Engineering. The committee of direction conducts the business of the division, authorizes orders, defines duties, and fixes the number of and appoints the members of certain special committees as may be necessary to investigate and report their findings and recommendations upon any subject to be considered by them. The following committees are provided for: (1) On electricity; (2) on overhead and third-rail working conductors, and (3) on crossings of power and other service wires.

The officers of the electrical division are George Gibbs of Gibbs & Hill, New York City, chairman; Edwin B. Katté, chief engineer of electric traction New York Central Railroad, New York City, vice-chairman; committee of direction, Messrs. Gibbs, Katté, A. S. Baldwin, vice-president Illinois Central Railroad; C. L. Bardo, general manager New York, New Haven & Hartford Railroad; H. B. Earling, general manager lines west, Chicago, Milwaukee & St. Paul Railroad; J. E. Crawford, chief engineer Norfolk & Western Railroad; J. H. Davis, electrical engineer Baltimore & Ohio Railroad. There are still two vacancies to be filled in the committee of direction.

The overhead crossing specifications report was the same as that presented at the Atlantic City convention, report No. 304 A, referred to in the convention report supplement of this paper, issued on Oct. 11, page 71.

Bulletin News Page

Summary of the Principal Happenings of the Industry of Current Interest Since the Last Issue of This Paper Was Published

PRINTED DECEMBER 4, 1919

"Dan" Pierce has joined Ivy L. Lee in general publicity work.

The Brooklyn (N. Y.) City Railroad has withdrawn its extra fare charge on the Flatbush Avenue Line pending a determination of its rights by the courts.

Fares in San Diego, Cal., have been ordered readjusted and the zone system prescribed.

Bankers who have reviewed the affairs of the Brooklyn Rapid Transit Company see the system's only financial hope in an increase in fare.

The net operating revenue of the Virginia Railway & Power Company, Richmond, Va., declined \$252,570 for the year ended June 30, 1919, over the previous year.

The *Wall Street Journal* says that much new financing by public utilities is in prospect.

Bankers point out that obligations of the Baltimore railway are much more onerous than those of the Philadelphia Rapid Transit Company.

An interesting comparison of conditions under municipal ownership and under private operation is contained in the award of the arbitrators at Portland, Ore., advancing wages on the private lines there.

The Massachusetts Institute of Technology suggests a new alignment between big business and the institute, profitable alike to both.

The city of Lawrence, Mass., required to choose between jitneys and the trolleys, has eliminated the jitneys.

The Columbia Railway, Gas & Electric Company, Columbia, S. C., has offered to sell its railway lines to the city.

William E. Rolston, formerly superintendent of power and equipment of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., has been appointed superintendent of power of the Kansas City (Mo.) Railways.

A decision by the United States Supreme Court is interpreted to mean that the Public Service Commission of Missouri has authority to fix rates regardless of franchise provisions limiting fares to 5 cents.

The State Supreme Court of New York has ruled that because of provisions in the company's franchise which limit the rate of fare, the Public Service Commission has no authority to increase fares on the Binghamton Railway.

The Railroad Commission of California says a 5-cent fare is sufficient for the Los Angeles Railway Corporation and that there is no need for a charge for transfers. The engineers who conducted the investigation believe that economies and im-

provements are possible. One-man cars are recommended. Relief for the company from paying is another reform suggested.

The Public Service Railway, Newark, N. J., has been authorized to abandon the zone plan as modified recently by the Board of Public Utility Commissioners and to return to a flat 7-cent charge with 1 cent for each transfer.

The Public Service Commission of New York has approved the reorganization plan for the Buffalo (N. Y.) Southern Railway.

The shareholders of the Cities Service Company, New York, N. Y., have approved the creation of an authorized issue of \$100,000,000 of second preferred stock.

The report of the engineers retained by security holders of the Interborough Rapid Transit Company, New York, N. Y., to inquire into that company's affairs confirms the need of the company for additional revenue if the company is to be saved from receivership.

The reorganization plan for Oakland, Antioch & Eastern Railway, Oakland, Cal., is to be modified.

The property of the Southern Traction Company, East St. Louis, Ill., may again be offered for sale at foreclosure, as the purchaser is in technical default in making the purchase payments.

Traction securities in New York shrunk in value more than \$106,000,000 during the period from Jan. 2 to Nov. 10.

A special session of the Legislature of Michigan is urged for the purpose of considering the question of bonding the city of Detroit so that subways may be built at public expense.

A substitute is offered by E. R. Morse, transit commissioner of Pittsburgh, Pa., for the city's proposal of a \$6,000,000 downtown subway loop.

The director of city transit of Philadelphia takes issue with the proposal of President Mitten of the Philadelphia Rapid Transit Company over Mr. Mitten's plan for relief for the company.

The Public Service Commissioner for Greater New York is expected to reiterate his suggestion for consolidation of the lines in New York as a step in the solution of the railway problem in that city.

Arbitrators have decided in favor of a maximum wage increase of 10 cents for the employees of the Des Moines (Ia.) City Railway.

The court has stepped into the street railway controversy at Toledo, where service has been abandoned, and has proposed terms for a temporary settlement, with other suggestions looking toward permanent relief. In the opinion of the court Toledo has made itself a joke to all the rest of the country.

Railway operators are contributing to a discussion on fare being conducted by the *Chicago Daily News*. Among the railway men who have participated are President Mitten of the Philadelphia Rapid Transit Company, President Brooks of the Detroit United Railway and L. A. Busby, president of the Chicago Surface Lines.

The Portland Railway, Light & Power Company, Portland, Ore., as the result of a wage award increase, has asked the Public Service Commission to determine upon a fare charge that will permit the company to meet its obligations.

The Shore Line Electric Railway in Connecticut has asked the court to determine the right of the company to discontinue service that is unprofitable. The property is in the hands of a receiver.

St. Louis has taken to the token.

The recent daily average of passengers carried on the surface and rapid transit lines in Greater New York has been 6,400,000. The fares per capita have increased to 370. The cold figures of the Public Service Commission covering passenger traffic in New York last year deserve careful reading.

All lines of the Terre Haute division of the Terre Haute, Indianapolis & Eastern Traction Company except one have been equipped with safety cars.

The Chicago (Ill.) Surface Lines has been ordered to sell ten tickets for 65 cents and books of fifty tickets for \$3. The Public Service Commission, however, has refused to order the discontinuance of the 7-cent cash fare.

A dispute has arisen over the interpretation of the terms of the loan of the War Finance Corporation to the New Orleans Railway & Light Company.

A bill of foreclosure has been filed against the Aurora, Elgin & Chicago Railroad, Wheaton, Ill.

A receiver has been named for the Northampton, Easton & Washington Traction Company, Easton, Pa.

The operator of New York's municipal busses sees a great future in these vehicles as operated by himself.

The merit system has been applied to the employees of the Seattle (Wash.) Municipal Railway by Superintendent Murphine.

The manager of the Brooklyn City Railroad, recently separated from the Brooklyn Rapid Transit Company, sees a deficit of \$400,000 before him for the year ended Aug. 31, 1920, with no allowance for Federal taxes, payment of rentals or interest on securities outstanding.

The wages of trainmen in Portland, Ore., have been advanced 6 cents an hour under arbitration.

News of the Electric Railways

Principal Happenings Up to Closing of Forms for This Issue, on Dec. 1. Issue Printed Dec. 13, 1919

FINANCIAL AND CORPORATE . TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

Railway Ready to Sell

South Carolina Company, Insisting on Its Rights, Offers to Dispose of Its Property to the City

Edwin W. Robertson, president of the Columbia Railway, Gas & Electric Company, Columbia, S. C., on Nov. 8 transmitted a letter to the City Council in which, speaking for the directors, he offered to sell the railway to the city.

BUSINESS RUN AT LOSS

It is pointed out that the business is being operated at a loss, the deficit from Jan. 1 to Nov. 1 being \$134,886. Mr. Robertson emphasizes that the present system cannot be maintained indefinitely with its sources of revenue so sharply reduced. In his letter Mr. Robertson says:

For some time now this company has been operating its railway at a decided loss, as shown by the figures in statements hereto attached, and any additional burdens placed upon the company at this time will react to the discomfort and inconvenience of our citizens.

Municipal ownership and operation of city railway lines have been before the people of many municipalities and the advantage claimed for such ownership and management has been so thoroughly discussed that I will not attempt to advise you along these lines. If Council deems it to the best interest of the citizens of Columbia that the railway lines should be owned and operated by the city government, in the full faith and belief that the same can be operated as well and more economically, I am authorized to offer to sell the railway lines and equipment belonging to this company to the city of Columbia on a fair valuation basis as of the date of this letter. There is one large item I readily see can be saved under municipal ownership which is now a heavy burden on this company, to-wit: taxes. This year taxes will amount to practically \$92,000.

In the past we have been able to give to the citizens of Columbia what we have every reason to believe is one of the best electric railway services in the country, and we have been enabled to do this because of profits made from other departments of the company which were not expended in dividends to the stockholders, but used to improve and better the service in every respect. The recent decisions of the Public Service Commission have taken away our means to continue this course, and I cannot say at this writing how much longer the company will be able to maintain the present service. Certainly if additional paving burdens are forced upon us there is no other alternative save reduction in the number of cars operated.

The losses as set forth from the books by Mr. Robertson range from \$10,809 for February, the lowest for the year, up to \$16,757 for September, the highest. The total receipts were \$369,459 against operating expenses amounting to \$504,346, or a net loss of \$134,886. This does not include interest on bonds and taxes.

At its meeting on Nov. 11 the City Council took no definite action on the proposal of the company to sell the railway to the municipality, but passed a resolution to the sense of which was that Council would expect the company to pave the car tracks on Divine Street as requested in another resolution passed at a recent meeting. The matter of buying the railway will be discussed later.

CITY INSISTS ON PAVING

When the letter of Mr. Robertson was presented to the Council Councilman Coleman stated he considered the part relative to the paving of the car tracks along Divine Street in Shandon separate from the proposal to sell the railway to the city and he thought that Council should insist on its previous resolution that the paving work be done. He con-

tended that the paving was being damaged by the tracks not being paved. A resolution was then put and carried calling upon the company to proceed with the paving as referred to in the previous resolution, which brought forth Mr. Robertson's letter.

As to the matter of buying the railway it was proposed that Council hold a special meeting and if it considered the plan feasible to have a committee meet with a committee of the directors of the railway, to discuss the matter and also to look into the advisability of purchasing the entire interests of the company in case an offer on a fair basis be made.

It is understood that the company will persist in its refusal to pave the track on its own right-of-way. This right-of-way was purchased or received as a gratuity from a land development company. The land on which the tracks are laid now happens to be in the streets as extended to meet the requirements of the growth of the city.

Ten-Cent Wage Increase in Des Moines

The employees of the Des Moines (Ia.) City Railway will get a maximum wage increase of 10 cents according to the decision of the arbitrators. C. W. Reese, representing the public, and Fred Sargent, representing the company, have signed the agreement making it effective at once, but Ben J. Wiley, the representative of the employees on the arbitration board, refused to sign the agreement. He stated, however, that the terms would be accepted by the men.

The rates of pay which have been determined upon for the men by the board are: 51 cents an hour for the first three months of service, 54 cents for the next nine months, and 57 cents after one year. The men demanded a maximum of 65 cents. The same three arbitrators some months ago agreed upon 50, 55 and 60 cents contingent upon the passage of a 6-cent fare, but this was turned down at a special election. Judge Martin J. Wade, of the Federal Court, then ordered the 47-cent scale re-established.

The new agreement is retroactive to March 1, 1919, and continues until the present contract between the men and the company expires on March 1, 1920. As the company has paid a portion of the time on the basis of the 60-cent scale a credit will be due according to the recent decision of the arbitration board.

Improvement Program for St. Louis

The annual report of Charles S. Butts, engineer for the department of public utilities of St. Louis, Mo., outlines improvements which the United Railways can make for the benefit of the city. Mr. Butts' improvement program calls for the expenditure of \$2,000,000. He recommends the construction of a car line from Meramec Street through Carondelet Park to the southern limits of the city. The report urges the extension of several other lines to outlying parts of St. Louis.

Consolidation as a Way Out

New York Commissioner, It Is Said, Will Again Urge Merger as a Means to Traction Settlement

The talk of a merger of the traction lines in New York has again been revived. The rumors come to New York via Mount Clemens, Mich., where Lewis Nixon, public service commissioner, has been spending a vacation. Report has it that the data and findings in connection with the various inquiries into and the engineering reports on the New York City companies have all been transmitted to Mr. Nixon and that he has been devoting no small part of his time to the consideration of what had best be done.

SEVERAL CONFERENCES RECENTLY

For all this there would appear to be some foundation in fact. Mr. Nixon has conferred several times with the representatives of the various railways and early in the present proceedings urged that all negotiations be conducted in the spirit of give and take. He has said previously that he was inclined to favor service-at-cost, indeterminate grants in place of the present perpetual franchises, the valuation of the properties in the interest of the city, the right of the city to purchase the lines, the abolition of holding companies and the termination of the present leases.

If rumor is to be believed then Mr. Nixon has modified his views to the extent of considering it advisable to bring about consolidations of the lines in the boroughs of Manhattan and the Bronx as a unit and those of Brooklyn and Queens as a unit, with the ultimate goal a final consolidation of all the companies rather than the first objective as reported some time ago.

From all the conferences looking toward a readjustment of affairs the present city administration, headed by Mayor Hylan, has stood aloof. Thus the effort to have the Mayor participate has failed. In fact one of the developments in connection with the inquiry by the commission into the transit situation was a passage at arms between the Mayor and the commissioner. In political circles the tilt between the Mayor and the commissioner has been construed as a rupture between the Mayor and the Governor, by whom Mr. Nixon was appointed. Whatever the significance of these moves from a political standpoint may be, there can be no mistaking the uncompromising attitude of the city administration toward the local railways.

SECURITY READJUSTMENT OF PROBLEM

As for Commissioner Nixon it is said that upon his return he will have ready for submission to the officials and legal representatives of the companies a complete plan for the merger. All this would have to be presaged upon the ability of those in charge to reconcile the holders of the various security issues involved to the changes in the nature of their holdings which would necessarily have to follow.

Plan Suggested for Temporary Toledo Resumption

City Sought Mandatory Order—Court Suggested Friendly Temporary Adjustment—Company Willing to Resume on Assurance of Protection

The Toledo, Ohio, abandonment case has reached the courts. Shortly after the cessation of service by the Toledo Railways & Light Company following the vote by the people upholding the ouster ordinance Mayor Schreiber hinted at a legal way to require the company to resume operations. It appears now that the Mayor had in mind a law passed recently, for he applied to Judge Killits of the District Court for the Northern District of Ohio, Western Division, for relief.

COURT SUGGESTS TEMPORARY SETTLEMENT

The case came before the court on Nov. 28. Judge Killits said he was ready to order the cars back to the streets immediately upon the formal order of Mayor Schreiber now in court, but he expressed the belief that the order of the Mayor lacked the sanction of the City Council. To this Mayor Schreiber declared he would call Council in special session. In his suggestion for operation of the cars immediately Judge Killits proposed to appoint a commission, composed of six or ten members, equally divided between adherents of municipal ownership and those favoring the Tayler service-at-cost plan.

Under this plan, he said the cars could be operated at once as he would suggest appointing Frank Coates, president of the Toledo Railways & Light Company, operating head of the traction system, while the city officials and traction owners consider details of the franchise drafts they now are working upon.

The plan proposed by Judge Killits has been summarized as follows:

1. Provides for resumption of car service at once, on temporary basis, if H. L. Doherty, Mayor Schreiber and Council accept court's suggestions for temporary and permanent settlement.
2. Requires Council first to pass emergency resolution, ratifying Mayor Schreiber's application for mandatory order for resumption of car service under Miller law.
3. Judge Killits then to begin operation of railway for sixty-day period, preserving company organization intact, and appointing President Frank R. Coates operating officer. Court to determine fare, schedules, re-routing.
4. For permanent settlement, Mayor and Council must agree to accept assistance of a commission, to be appointed by Killits and approved by Mayor and Council.
5. Commission to consist of either six or ten members, divided equally between municipal ownership and Tayler plan advocates.
6. Commission, Mayor and Council to work out ordinances providing for both plans to be submitted to popular vote.
7. Acceptance of court's proposal by either party not to be deemed final until order is framed and submitted designating exactly how cars shall be operated temporarily.
8. If both city and company refuse to accept court's suggested order, Judge Killits may abandon further attempt to help.
9. Court reserves judgment as to what will be done further if one party accepts and other refuses to accept suggested plan.
10. Judge Killits expresses opinion court has power to order resumption of transportation, under Miller law, but says this or any other order would be subject to appeal and indefinite delay.

COURT EXPLAINS SITUATION

The remarks of the court on the general situation were very significant. Judge Killits said in part:

It will occur to everybody that the city loses in prestige and promise every day the cars stay out; that citizens in private and business life are suffering financially and, what is more important, the health of our people will be seriously impaired with the bitter season at hand.

The controversy which has afflicted Toledo for fifteen years ought to have a quick end. It has disastrously hampered the city's growth and has embittered its people, arraying them in opposing

classes and breeding heated dissensions among them. Some of the situations it has produced all of us would like to forget. Wherever you go, you find that we have the reputation of a quarrelsome, divided people. The local papers might fill pages of editorial comment ridiculing Toledo for its present plight, which newspapers from the Atlantic to the Pacific have recently printed. Plainly, we have made ourselves a joke to all the rest of the country. We have put upon ourselves an intolerable burden, and a great many people think that a very great sacrifice might well be borne if thereby Toledo could throw it off for all time.

But, after all, very little sacrifice is necessary to put our city on the map again as a community of sensible, enterprising people. We would at one step go more than half way out of the mire if everyone of us would meet the matter coolly and as a fresh proposition, with open minds, and a fair regard for the feelings, views and interests of each other, and, above all, with a fixed determination to do the very best for the city, in short, if we would act just as citizens of a democracy should act, to get the best result out of the principle of democracy.

What can the court do to help? God knows this court will do all it can, and it will not stick for propriety or conventionality. In the first place, the court can make no order in the pending case which is not subject to review by a higher court, and it would only make things worse if the court should enter an order which a higher court might set aside. This court is bound to a best effort to get an order which it feels a higher court would sustain, and then enforce it. This order must protect rights which the parties enjoy, otherwise it will not stand. It must be so written that it will give the least possible excuse for appeal. We have in mind a discretion abiding in this court the exercise of which cannot be reversed unless it is seen on the face of the record that the discretion has been unwisely used, and we think we know how to use it without encountering reversal. An order in this line does not involve the Miller law in any way whatever, but to issue it would not directly involve the running of cars. It would, however, create a situation which would probably bring about the result in the end. We also believe that the court has the power to issue an order based upon the Miller law, directly going to the resumption of transportation, leaving only to the court's discretion the terms and conditions of that order.

In both cases, however, as we have said, an appeal could not be prevented, and the order might not go into effect until this court was sustained by a higher court.

So far as giving immediate transportation through this court is concerned, two factors are considered:

First, how far is the court willing to use its discretion?

Second, what is the disposition of the company respecting obedience to the court's order without appeal?

Now this court, deeply impressed as we are with the necessity for quick resumption of service, will not use its discretion to that end except upon conditions which will, first, protect the company in every legal right it possesses, giving it every safeguard it should have, so that it would have the least possible chance for success in a higher court, and which will, secondly, encourage the company to refrain from testing the order in a higher court. We must impose conditions, also, which will work to as speedy a final adjustment of the street car question as can be consistent with safe action.

The court then outlined at some length the plan for settlement which has been summarized previously, stating first of all that the Council must pass an emergency resolution ratifying the act of the Mayor in making application to the court. In conclusion the court said:

These suggestions are submitted to the parties with the sincere hope and with much confidence that they will appeal to their good judgment and public spirit, and that they will so far meet with the approval of both sides that the parties will cordially unite in mutual agreements within the limits of these conditions which will reduce to the minimum the court's work therein.

A meeting of the company officials and city officers with Judge Killits followed almost immediately and the company asked more time to consider the proposals of the court for a settlement by temporary restoration of service as suggested by the court. No time was set for another conference and the meeting of the Council called for Saturday to pass the emergency resolution ratifying the appeal of the Mayor to the Court was postponed.

At the conference the company did not refuse to accept the court's proposal. It merely presented these conditions upon which it might bring the cars back:

1. A temporary ordinance granting the right to operate cars and protect the company.
2. A high enough temporary fare for service to make a permanent settlement at lower fares attractive to the people.
3. Elimination of bus competition during the interval of temporary service.

MAYOR QUOTES NEW LAW

The Mayor bases his case against the company on the so-called Miller law. This measure was passed by the Legislature on April 15, 1919, and was approved on May 16. It enlarged the powers and duties of the Public Utility Commission with reference to the abandonment of service facilities of railroad and public utilities, and provided that no political sub-division of the State shall require to be abandoned, and no public utility (including inter-urban and street railway service) shall abandon the operation of any such public utility until reasonable notice is given to the Public Utilities Commission so that body may inquire into the propriety of such cessation.

In appealing to the court for a mandatory order compelling the company to restore service under the old conditions, the city contends that at "no time has any application been made to the Public Utilities Commission for leave to abandon service or remove such cars and no order permitting such abandonment has ever been allowed by such Public Utility Commission, nor has such leave ever been granted by this court or any other court, either as to city or interurban cars."

The court entertained the city's plea to the extent of notifying the city and the company to appear before him on Nov. 21. After a short hearing Judge Killits put the case over a few days. This was done on the plea of Thomas H. Tracy, counsel for the company, who said he desired time to consult with Henry L. Doherty of Henry L. Doherty & Company, operating managers of the local company. Mr. Tracy said that counsel for the company believed the Miller law was not applicable to city street railway systems.

HISTORY REVIEWED BRIEFLY

It should, perhaps, be explained that since January, 1914, the company has been operating under a day-to-day franchise, the city having the right to oust the company on twenty-four hours notice and the company having the same right to abandon operation. The court in April, 1918, ordered a straight 5-cent fare and a charge of 1 cent for each transfer. In May, 1919, wages were referred to War Labor Board. Increases were granted, and in June the fare was increased to 6 cents with 2 cents for a transfer. Mayor Schreiber retaliated with an ouster ordinance. This was passed by the Council, but its application was postponed by a initiative petition putting the matter to the people at the polls. In the meantime the company submitted a service-at-cost plan, but this was shelved. At the election the voters upheld the ouster measure and as soon as the official count had been returned the company withdrew its cars across the border into Michigan. One of the things Mr. Doherty wants is a decisive vote for municipal ownership or an expression of opinion favorable to the company being granted a workable franchise under private ownership.

Meanwhile the work is being kept up of securing names to the petition looking toward the filing of a request for an initiated franchise ordinance which would place the issue squarely before the public.

Lawrence Service Restored

Railway Withdraws Service Compelling City to Decide Definitely Between the Trolley and the Jitney

A notable struggle over jitneys in Lawrence, Mass., was brought to a climax on Nov. 26 when the public trustees in charge of the Eastern Massachusetts Street Railway withdrew electric railway service after the City Council had failed to enforce an order for the revocation of all jitney licenses. The expressed attitude of the trustees was this:

A street railway and jitneys can not both live in the same community. These rival transportation mediums operating against each other are an economic waste. The people should choose between the two. If the people want jitneys they should abolish the street railway, but if they want the street railway they should abolish the jitneys.

The public trustees, appointed by Governor Coolidge to take charge of the railway under the Public Control Act, providing for service-at-cost, have had numerous clashes with city and town officials over the jitney problem, and in every instance thus far the verdict of the people has been in favor of the railway, and jitney competition has been eliminated.

Immediately service had been withdrawn there was such public clamor that the city officials, after ineffectually appealing to the Governor to compel the trustees to restore railway service, found it necessary to confer with the public trustees and submit to terms which covered all of the points made in the original ultimatum served upon Mayor John J. Hurley and the other members of the Lawrence City Council on Nov. 11.

ORDINANCE PASSED RESTRICTING JITNEYS

After their conference with the public trustees in Boston, on Nov. 26, the Mayor and City Council returned to Lawrence and at a midnight session passed an ordinance which provides that jitneys cannot operate on any street or part of a street where the street railway is now in operation and that motor buses cannot operate upon any other street until public necessity for the same has been shown and the street railway refuses to take care of the transportation thereon.

The one trolleyless day in a drizzling rain during which the people in the outlying districts were left practically stranded and the retail merchants reported business almost at a standstill, apparently convinced the City Council that the city without trolley cars was unthinkable.

As the result of the unrestrained jitney traffic in streets already served by the Bay State in Lawrence the public trustees discovered in the segregation of the Lawrence District accounts that the monthly loss in earnings was \$25,000. Although jitney regulations had been adopted by the Lawrence City Council, the Department of Public Safety paid little or no attention to their enforcement.

These facts were brought sharply to the attention of the Chamber of Commerce and a service committee composed of five representative citizens was appointed, which throughout all the dealing between the public trustees and the City Council stood staunchly by the public trustees in favor of giving the railway the right to operate without having to contend with the unfair and wasteful jitney competition.

George E. Ricks, secretary of the Lawrence Chamber of Commerce, and James H. Bride, a wholesale plumber and steam fitter, gave their services in conducting a campaign of education which aided the public trustees materially in effectively

presenting their case to the people of Lawrence.

Manufacturers, retail merchants and newspaper publishers also got into the line and one newspaper conducted a referendum of its own which showed conclusively that there is an overwhelming public sentiment in favor of the street cars. This newspaper, *The Telegram*, printed on its first page for several days a ballot and invited its readers to express their choice as between street cars and jitneys. About 95 per cent of the replies expressed preference for street cars.

REDUCED FARE PLAN SUGGESTED

When the railway service was restored on Nov. 28, the reserve cars were operating on all of the local lines, and Howard F. Fritch, assistant general manager, immediately took up with the citizens' service committee the matter of lower fares which the public trustees promised in the event of the elimination of the jitney traffic. It is proposed to put into effect in Lawrence on Dec. 7 a sixteen-ride \$1 punch ticket with no transfer privilege.

Since the passage of the ordinance by the City Council at its special session a marked change has come over the Police Department, which is now enthusiastically co-operating with the public trustees and strictly enforcing the order of the City Council revoking the jitney licenses. The new city ordinance will not become effective until Dec. 6 under the provisions of the Lawrence City Charter, but the existing regulations under which the jitney licenses were revoked will remain in force until the new ordinance becomes operative.

In the city of Brockton jitney competition has been completely removed without the public trustees being obliged to resort to the cessation of service. When Patrick F. Sheehan, manager of the division there, announced the proposed discontinuance because of unfair jitney competition, neighborhood meetings were held and the people expressed themselves so strongly in favor of the continuance of railway service that the Board of Aldermen voted five to one for the revocation of all jitney licenses under the existing ordinance and Mayor William L. Gleason having served notice that it was his intention to make the Police Station the destination of every jitney driver who operated after the revocation became effective, there has been little or no irritation from that source since. Brockton has also been given a sixteen-ride \$1 punch ticket without transfers.

JITNEYS ELIMINATED IN OTHER CITIES

Lowell, Fall River and Taunton are the other Bay State System cities where there is no jitney competition and all three are enjoying reduced ticket rates which appear to be working out satisfactorily.

Optimistic About New York Busses

Application was made to the Board of Estimates of New York City on Nov. 21 by Grover A. Whelan, commissioner of plants and structures, for authority to continue the operation of the various bus lines in the city until July 1 next and to charge the bus owners \$2 a day for each bus. This money, Mr. Whelan suggested,

could constitute a fund to meet the expenses of supervision. The present authorization under which Mr. Whelan is permitting the busses to operate expired on Dec. 1.

In his report on the busses, Mr. Whelan said that 114 of them were in operation on Nov. 14, and that they carried 75,000 passengers daily. He thought that if the city would undertake the operation of a unified system of city-owned busses great success would attend the venture. He submitted figures showing that 100 busses, seating twenty-seven passengers each, would cost \$550,000, and that garage equipment and spare parts would cost an additional \$20,000.

His figures for operation and maintenance, including garages, the employment of 180 chauffeurs at \$1,800 a year each, starters, checkers, etc., total \$635,000. Then Mr. Whelan's report says that it is proposed to operate ninety-two busses on the nine routes, which have bus service at the present time, eight busses being held for emergency service.

He estimates the profits of operation at \$376.80 a day. Then his report reads:

These nine routes total a length of only 25 miles, and on account of their length are bound to be profitable sources of revenue, and the service of these 100 busses will give, I confidently expect, in one year after city operation is commenced, a much greater income than is quoted here.

Endowment on Business Basis

Massachusetts Institute of Technology Proposes a New Relation With Industry Big With Possibilities

Big possibilities for the future of American engineering schools are inherent in a plan which the Massachusetts Institute of Technology is now developing. This plan not only puts contributions to the endowment fund upon the sound business basis of quid pro quo, but affords an opportunity to many industries of contributing without charging the appropriations to bequests and charities.

The Institute, it may be recalled, is seeking \$3,000,000 in endowment funds—or rather, \$4,000,000 from the public in order to secure a like amount already promised by the "mysterious Mr. Smith," the income from the fund to be used to pay more nearly adequate salaries to the members of its teaching staff.

In the quest for this amount, "Tech" has decided to place before the great industrial corporations a plan by which they will agree to pay an annual fee to the institute in return for certain specified services and privileges. The Institute, on its part, permits the corporation to have the use of its library, the opportunity to consult its professors, and the first chance at hiring Technology men.

Fears that the proposal may conflict with the work of the consulting engineer are answered by the obvious fact that the problems submitted to the institute would be beyond the scope of the private engineering firm to handle and by the further fact that the consulting experts of the country are already swamped with the unending questions submitted to them for solution.

Under its new constitution, the State of Massachusetts is compelled to withdraw the aid formerly given to Technology. The per capita income from the student body is insufficient to meet the actual cost of instruction, and the tuition fee cannot be further increased without working a hardship on many students. Hence the turning to industry and the plan for a closer and more helpful relationship than has ever before been obtained.

Wage Advance Granted in Portland, Ore.

Arbitrators Compare Portland Railway With Seattle Municipal Line and Recommend Relief

By a unanimous decision of the board of arbitration considering a scale of wages for the trainmen and other classified railway employees of the Portland Railway, Light & Power Company, Portland, Ore., a schedule was signed on Nov. 14 for the period from Oct. 1, 1919, to April 30, 1920, subject to reopening at intervals of six months commencing May 1, 1920.

SIXTY-TWO CENT MAXIMUM ESTABLISHED

Wages of platform men are raised from a maximum of 56 cents an hour to a maximum of 62 cents an hour and those of other classified employees to a scale corresponding with that figure.

The arbitrators were Otto Hartwig, appointed to represent the employees; F. C. Knapp, appointed to represent the company, by whom Ira F. Powers was selected as the third member and designated as chairman of the board of arbitration.

In concluding the task the members of the board expressed their gratification that most cordial relations exist between the employees and officials of the corporation, and commended the spirit in which the parties to the controversy had presented their testimony.

The schedule showing the present wages and scale of the award for platform men, applying alike to conductors and motormen, is as follows:

	Present rate per hour	Award
First three months.....	\$0.52	\$0.58
Next nine months.....	.54	.60
After one year.....	.56	.62
One-man car operators, 6 cents an hour above scale.		
Extra men, a month.....	\$90	\$100

In the schedule for classified employees, including blacksmiths, carpenters, machinists, painters, employees in the truck, air and other departments and in the carhouses, including laborers, there is a general advance in wages of from 3 to 4 and 5 cents an hour over the former agreement. This also applies to the interurban track force, bridge and building force, interurban station agents and employees and tellers at the carhouses.

SEATTLE LINES HELPED

During the negotiations reference was made time and again to conditions that prevail on the Seattle (Wash.) Municipal Railway. On this point the arbitrators say:

This board has not raised the Portland rate to the full level of the Seattle rate because of the following considerations:

(a) The financial condition of the Portland company as compared with the municipal fund in Seattle which is available for transportation expense.

(b) An effort has been made to adjust the rates fixed by this award in accordance with the award of the War Labor Board of August, 1919, taking account of the increase in the cost of living since that time.

(c) The cost of living is somewhat less in Portland than in Seattle.

Full data were presented to the board showing the present financial condition of the Portland Railway, Light & Power Company.

For the purpose merely of suggesting possible solutions, it may not be out of place to incorporate in this report certain comparative data applying to Seattle and Portland which the parties brought before this board.

The Seattle Municipal Railway department is relieved from the following items which are borne directly by the Portland company:

General taxes, franchise fees, legal department and accounting expense (assumed in Seattle by other city departments), bridge tolls, paving (assumed in Seattle by street department).

The aggregate of these expenses in Portland amounts approximately to \$600,000 per annum.

It further appears that Seattle is charging no depreciation on its railway system, while the Portland company is subject to a depreciation charge of \$366,000 a year.

Furthermore, it appears that Seattle is now paying from the general fund to the railway department approximately \$50,000 a year for carrying city employees. In Portland firemen and policemen are carried free.

In effect the increases in the cost of operating the Seattle system are thus assumed by the taxpayers, and unless the Portland public desires to undertake the necessary investment incident to acquiring the railway property and the consequent obligations of operation, some adjustment of revenue or expense would appear to be the only alternative.

Another very interesting feature of the Portland finding is the reference by the board to means of relief for the local company. On this point the board said:

This board does not conceive that it is its proper function to do more in this regard than to list the possibilities of increasing revenue and decreasing expenditures, all without recommendation, but in order that the public may consider the necessary effect of this award and give consideration to ways and means of insuring a continuance of service.

POSSIBILITIES OF INCREASING REVENUE

1. Increased fares.
2. Charge for transfers.
3. Limiting length of ride for one fare.
4. Payment of fare by city for firemen and policemen.

POSSIBILITIES OF REDUCING EXPENDITURES

1. Relief from bridge tolls.
2. Relief from franchise fees.
3. Reduction of taxes.
4. Relief from paving obligations.
5. Reduction of service.

It has appeared to this board that the prosperity of the people of Portland would be seriously affected by the insolvency and bankruptcy of a utility which plays such an important part in our industrial and commercial activity, and that the board would fail in its duty to the public if it should withhold a clear and comprehensive statement of the facts brought out at its hearings, which, with their obvious results, are of such importance to the public generally.

Merit System in Seattle

No Political Nepotism on Seattle Municipal Railway Under Civil Service Direction

A new system of merit marking for conductors and motormen on the Seattle (Wash.) Municipal Railway has been started by T. F. Murphine, superintendent of public utilities. It is known as the "Discipline-by-Record" plan. Under the new system, the top notch pay of \$5.25 a day goes only to the men who rate 0.85 or better in the city's merit ledger. Those whose marks lower their standing a certain per cent go into the second grade and are paid only \$5. Lower ratings calling for \$4.75, and if the rating falls below 0.70, it means that the employee is in line to quit the service automatically.

BASIS OF MERIT MARKS

The merit markings are based on personal appearance of the trainmen, courtesy to passengers, efforts to insure safety, and suggestions for improvement of service. There are thirty-five causes for demerit marks and eight causes for merits.

Mr. Murphine states that the trial of the system so far made shows that the application of the merit plan has improved the service of the company to a remarkable extent. Each man's record is posted daily, and he is accorded the right to protest against any demerit, if he has an acceptable excuse.

The railway men are under the rule of the city civil service commission, which requires each department head to report every sixty days on a percentage basis the relative efficiency of his employees. It was this fact that led to the installation of the merit rating system for the railway men.

The "Psychological" vs. the "Mathematical"

Many Differences Exist Between Operating Terms and Conditions in Baltimore and Philadelphia

The Philadelphia correspondent of the Baltimore Sun, in a recent communication, contrasts the method of the Philadelphia Rapid Transit Company and the United Railways & Electric Company, Baltimore, in an endeavor to increase its receipts to meet increased operating expenses, and exemplifies as follows:

The difference in the methods of the two companies in securing the additional money they need might be described as the psychological versus the mathematical method. The Baltimore company, finding itself short of sufficient money to maintain and operate the property, pay its fixed charges, and get a sufficient balance to surplus for credit purposes, put a lot of experts on its books, figured how much it would require and then asked the Public Service Commission to establish a fare that would yield the amount required. That was the mathematical method.

The Philadelphia Company, in a similar financial situation, put some experts in another line to studying the situation and evolved the salesmanship plan—the plan of selling more units of the thing it produces, which are street-car rides; of filling the empty seats in the cars at non-rush hour periods, of inducing the man who otherwise would walk to ride by convincing him that by riding instead of walking he would be helping to maintain the 5-cent fare and thus do his city as well as himself a good turn. That is the psychological method.

In commenting on this statement Nelson, Cook & Company, Baltimore, bankers, said in part:

In other words, the Baltimore company appealed to the Public Service Commission for an increased fare while the Philadelphia company appealed to the public to ride oftener and thus prevent the necessity for an increased fare.

The fact that the Philadelphia company is still charging 5 cents and paying dividends, while the United Railways is charging 6 1/2 cents and not paying dividends, has been illustrated as a reason why the Public Service Commission should not authorize an increased fare. On its face this is a reasonable argument, but most unreasonable when it is explained that conditions regulating and controlling the two systems are absolutely dissimilar.

The Philadelphia Rapid Transit Company is enjoying the benefit of the "skip-stop" policy, once in force at Baltimore and repealed at the protesting request of the public. This privilege is estimated to be worth \$1,000,000 per annum to the Philadelphia company. This company charges 3 cents for transfers at 580 points and gives free transfers at 320 points. The revenue from transfers is estimated at \$1,500,000. The Philadelphia company pays, under a contract made with the city, \$550,000 per annum "in lieu and satisfaction of all liability on the part of the company and its subsidiary companies for the paving, repaving, and repair of the streets occupied by their surface lines, the obligation of the companies with respect to the removal of snow therefrom, and all license fees, and shall be in lieu of the right of the city to impose upon the company similar obligations and charges." The only other tax required is the usual tax on real estate. The Philadelphia company charges full fare for children over four years of age. It would appear that the total obligation of the Philadelphia company to the city of Philadelphia is less than 6 per cent of its gross receipts.

Now contrast this condition at Philadelphia with what the United Railways is obligated to the city of Baltimore and its people. In addition to carrying children in arms free, the United Railways is compelled to charge only 4 cents for children under twelve years of age; it is required to pay a special tax (Park Tax) of 9 per cent of gross receipts within certain limits. In addition the company is compelled to pay all other corporation taxes, trackage, real estate, etc., and also a license tax on each car. It is compelled to pave and repave all streets occupied between the tracks and 2 ft. outside of the tracks, and is required to give free transfers, to clear the tracks of snow, and, in summer, to water the streets occupied.

The grand total of public charges last year was \$1,344,406 or more than 26 per cent of the net receipts after operating expenses. The park tax alone was last year \$755,407.

The United Railways pays \$1,344,000 in taxes and other municipal obligations, against the Philadelphia company's \$550,000—a difference in favor of the latter company of \$794,000. This is equivalent to 2 1/2 per cent annual dividend on the capital stock of the Philadelphia company. Now add to this estimate savings of \$1,000,000 to the Philadelphia Company from skip-stops and \$1,500,000 revenue from 3-cent transfers and we find that the United Railways is handicapped about \$3,294,000 in its competition with the Philadelphia Rapid Transit Company in its efforts to make both ends meet.

This is what we call the psychology of mathematics.

Mr. Mitten's Transit Plan Attacked

Improvement Program Pending Before Philadelphia Council Opposed by Mr. Twining—Counter Proposals Made

Plans recently advanced by Thomas E. Mitten, president of the Philadelphia (Pa.) Rapid Transit Company, for improving electric railway service in Philadelphia, have encountered opposition from William S. Twining, director of city transit, who has recommended to the City Council that Mr. Mitten's suggestions be rejected. Mr. Twining in a report submitted to the joint councilmanic committees on finance and street railways on Nov. 14, alleged that Mr. Mitten's program, if carried out, would subordinate the interests of the city to those of the company.

ORDINANCES INTRODUCED IN COUNCIL

Mr. Mitten's program was embodied in a series of ordinances recently introduced in the City Council and now pending before that body, as announced previously in the *ELECTRIC RAILWAY JOURNAL*. The plan calls for the release of the company from the annual payment of \$785,000 for street paving, in return for which the company agrees to abolish the 3-cent charge for exchange tickets, except in certain sections of the city, where the transfer privilege would be done away with. It includes a form of lease for the Frankford elevated line under which the company proposes to operate the road, now nearing completion, for a term of years beginning on July 4, 1920, at a nominal rental payment \$1 a year. It also provides for track improvements in the section adjacent to the City Hall.

Soon after the ordinances were introduced Director Twining requested President Mitten to answer a series of twenty-seven questions intended to throw light on the company's policy. Mr. Mitten in his reply characterized the questions as lacking in constructive value. After answering the series of questions categorically, Mr. Mitten said:

Co-operation between city and company is now more than ever essential to insure the best possible use of existing facilities. This management now respectfully submits that its record of the last eight years justifies the confidence of the people.

Constructive action should now displace carping criticism. The street car system should be developed to its greatest capacity, which is possible only of accomplishment after eliminating the 3-cent exchange.

The need of the car rider for increased transit is urgent, and the way should forthwith be opened to early use of the Frankford "L."

Mr. Twining promised to expand his criticism of the company's plans. His report to the councilmanic committees followed.

CITY TRANSIT COMMISSION PROPOSAL

In this report the director of the city transit, alleging that the company, even since its formation in 1902, had been "seeking the pocket of gold at the end of the rainbow," charged that Mr. Mitten's plan was designed to give the company a maximum of income with a minimum of expense and obligation. He further declared that in seeking to be relieved from paying charges, the company was seeking a direct contribution from the city in order to retain the 5-cent fare.

The transit director set forward a counter proposal for the operation of the Frankford "L" by which the city would lease the line to the company at an annual rental of \$600,000. The lease would run until 1957. Anticipating that the company might reject this proposition, he declared municipal operation to be the

only alternative. Mr. Twining's counter-plan follows:

The company shall agree to lease the completed section of the Frankford Elevated Railway from Front and Arch to Bridge Street, for a period running until 1957, at a fixed annual rental of \$600,000, and to give the same privileges as are accorded the company's lines in West Philadelphia. The company to agree to operate all extensions and other lines of the city's system upon terms to be settled by arbitration before the Public Service Commission. The city to furnish all funds necessary for the initial equipment of the Frankford Elevated ready for operation, the company to furnish all funds needed for additional equipment during the period of the lease; the city's rental to be considered as a part of the company's fixed charges and all matters pertaining to the service and fare to be regulated by the Public Service Commission, either directly or through a local board, as provided in the former agreement.

I regard this proposal as embodying the limit to which the city is justified in going. Under this proposal the operation of the city's lines will be secured on a unified basis and both the city and company will be protected by the State body legally designated for that purpose. It is an offer by the city to submit the terms for operating the remainder of the city's system to the arbitration of the Public Service Commission, and it is difficult to see what valid objections the company can raise to this proposal, or to see what other method can be adopted for harmonizing the conflicting viewpoints of the city and the company.

It is also difficult to see how the Public Service Commission can refuse to act in this matter, in view of its having final responsibility in all these matters.

President Mitten, after studying the report, addressed a letter to Director Twining in which he declared that the latter's

plan failed to solve the problem. Mr. Mitten said in part:

Municipal transit plans undertaken six years ago have failed to date to produce transportation for a single passenger. Discussion of the dead past does not produce transportation for Philadelphia now.

Director Twining makes such criticism of that which has been done by the Statesbury-Mitten management to increase and improve transit. This management recognizes that facilities are still inadequate, and with that knowledge has submitted certain definite proposals to Councils. The director condemns these proposals, recommends that they be put aside without further consideration and urges that the whole transit problem, past, present and future, be turned over to the Public Service Commission.

The following are vital objections to Director Twining's conclusions:

1. P. R. T. Operation. The director's proposal for a lease running to 1957 ties the hands of the incoming city administration. P. R. T.'s proposal, revocable on six months' notice, avoids this. P. R. T. cannot guarantee \$600,000 rental for Frankford "L" with a 5-cent fare, when on the City Transit Department's own showing the Frankford "L" cost will be 7½ cents per passenger.

2. Municipal Operation. The director's proposal for municipal operation, after unnecessary expenditure on the makeshift Sansom Street terminal, sacrifices the greatest public advantage of the P. R. T. proposal, i. e., through operation of the Frankford "L" and Market Street lines, including free transfer with surface lines.

The director's whole report promises nothing for the future, except continued discussion. It is exactly this policy that has resulted in no accomplishment in the past six years. The city needs more transit now. The company alone offers a plan to meet this need.

Contending that there was little likelihood of the enactment of the proposed legislation during the life of the present Council, Mr. Mitten on Nov. 20 wrote to the joint councilmanic committees asking permission to withdraw the pending ordinances. He plans to ask for the passage of the measures when the incoming Council meets in January.

Recommends Loop Plan Be Abandoned

City Transit Commissioner of Pittsburgh Opposes City Administration—He Also Recommends Municipal Ownership

Abandonment of the entire system of transit operation involved in the \$6,000,000 downtown subway loop approved by the voters of Pittsburgh, Pa., in the bond election of last July, is demanded by E. K. Morse, transit commissioner of Pittsburgh, in the annual report of the City Transit Commission submitted on Nov. 18 to the Mayor and the Council. Mr. Morse declares that municipal ownership and the operation of the cars at a straight 5-cent fare inside the city (the fare is now 7½ cents by ticket and 10 cents cash) would so far increase the car-riding habit as to insure revenues enough to operate the electric railway system. Failure to solve the traction problem, he said, has driven people from Pittsburgh. The report contains a chart showing that population of Pittsburgh has increased only 13.2 per cent in nine years, the smallest percentage of gain by any of the ten leading cities of the country.

The subway loop plan, so directly opposed by Mr. Morse in his report, was fostered by the city administration, and was retained in the bond issue by the administration. The commissioner insists the subway loop leaves unsolved the real problem—"rapid transit, which must be provided, or Pittsburgh cannot compete with Detroit, Cleveland and Cincinnati, all of which are providing rapid transit and rapidly outstripping Pittsburgh in population." The present report says:

The transit commissioner made his views against a subway loop very plain in the 1917 report, and has not had occasion to change them. The views expressed then were written after most careful consideration of surveys, data taken by the commission, plans and estimates. It was shown conclusively that a subway loop would not provide rapid transit; that

the city of Pittsburgh could not operate a subway loop; that the Pittsburgh Railways was the only company that could operate such a loop; that no additional revenue would be derived by its operation and for that reason the company could not be expected and should not be allowed to pay to the city any rental whatsoever for its use; that the building of the loopings back of the surface lines and passageways, such as Washington Street and other streets in Boston, had become such a financial burden to the company that it was then threatened with bankruptcy.

To begin with, \$6,000,000 will not build the proposed subway loop. It will not accommodate one-half the present number of street cars now entering the central business district; will not provide for future growth; will not take care of a single car from the Northside, and will not reduce the running time to or from the city in any direction. Those favorable to the subway loop argued that it was the beginning of rapid transit; that the subway loop would be used by rapid transit cars, and that it would relieve the downtown congestion. Nothing could be more misleading. Nothing would be, if ever built, more disappointing. Nothing could be more wasteful of the city's borrowing power than an expenditure of this kind and magnitude. . . . No city in the United States contemplated a subway loop such as that presented to the voters of Pittsburgh on July 8, a subway that each and every car entering it is planned to travel 8,400 ft. before passing back into the subway approach that it entered.

As a substitute for this, the transit commissioner urges that the city expend the \$6,000,000 it has voted, by building the first phase of the rapid transit plan submitted in a previous report by the transit commissioner. That, he said, would make a beginning of real rapid transit. In touching upon municipal ownership, he said:

In the recent investigation of the traction problem of Cleveland, Ohio, made by Barclay Parsons & Klapp, they give the riding habit as more than 325. If the same riding habit was obtained in the metropolitan district of Pittsburgh, the passenger revenue at 5 cents for the Pittsburgh Railways would amount to \$19,500,000 annually, more than enough to meet all expenses of the service company, and leave a balance. . . . If the street car system were under the control of the city, were it municipally owned and were service at 5 cents everywhere within the city limits and 10 cents beyond, the riding habit would

very soon be equal to that of Cleveland. As an investment, as a financial proposition, the street car service of Pittsburgh should take in more money than Cleveland and yield a greater net profit on the investment. The time has come when the city should enjoy the benefits of municipal ownership.

COMMISSIONER'S RECOMMENDATIONS

Mr. Morse's recommendations are submitted thus:

1. Start Rapid Transit: It will bring about the following solutions:
 - (a) The housing problem.
 - (b) Municipal ownership.
 - (c) "Service-at-cost" plan.
 - (d) Riding habit.
 - (e) Relieve congestion.
 - (f) Thereby protect Pittsburgh's supremacy.
2. Remove the Pennsylvania Railroad tracks from the Point and the Duquesne way. (These are elevated freight tracks running along the wharf of the Allegheny River, encircling a portion of the business section.)
3. Reclaim and improve the wharf.
4. Abandon the subway loop plan and
 - (a) Use the \$6,000,000 in constructing the Grant Street and Diamond Street units of rapid transit.
 - (b) Use these units for surface cars, until
 - (c) The rapid transit lines recommended in the report of 1917 are completed.

A Manager's Problem

Plea for Brooklyn City Railroad Made Before Local Chamber of Commerce by Company Executive

H. Hobart Porter, general manager of the Brooklyn (N. Y.) City Railroad, recently separated from the rest of the Brooklyn Rapid Transit System, addressed the Flatbush Chamber of Commerce on Nov. 15. Mr. Porter discussed more particularly the conditions confronting his own company, but he made it perfectly plain that many of the problems which have come up for settlement in Brooklyn are common to the industry as a whole. He went over the ground covering the total of receiverships of electric railways throughout the country, advances in prices and increases in the cost of doing business and cited the case of Toledo which through its arbitrary action is now entirely without railway service.

A \$400,000 DEFICIT

In referring more particularly to the electric railway situation in the borough of Brooklyn, Mr. Porter said:

The companies composing the Brooklyn Rapid Transit System suffered from these conditions as well as from certain problems of their own, with the result that the receiver of the company was ordered by Judge Mayer to cancel all leases, and contracts between it and the Brooklyn City Railroad, and to return the latter property to its original owners.

The receiver, in his petition to the court, estimated that on the basis of the present cost of materials, wages, and rates of fare, the gross earnings of the Brooklyn Heights Railroad for the year ended Aug. 31, 1920, had it continued to operate, would have been as follows:

Gross earnings	\$10,180,000
Operating expenses	10,043,000
Net operating revenue	\$137,000
Taxes	537,000
Net operating deficit	\$400,000

The operating expenses above mentioned include no payments for rentals, nor Federal income tax imposed on the Brooklyn City Railroad, nor for any interest upon any securities whatsoever.

Under these circumstances, it could hardly be claimed by any fair and reasonable property holder, business man or association that the company is not entitled to some measure of relief. Certainly the investors who own this property, admittedly of great value, may reasonably expect a return upon their investment.

The Brooklyn City Railroad is largely owned and controlled by residents of Brooklyn. Of its 1472 stockholders, 742 are women, 208 are trustees, administrators, executors, guardians, life insurance companies, charitable institutions and colleges, and 522 are other corporations and individuals.

The records of the company show that it received 100 cents on the dollar in cash for every share of stock issued. Under the direction of boards of directors, which have always been composed of prominent and representative Brooklyn citizens, this cash was invested in the company's property.

Detroit Council Persistent

Despite the Mayor, It Wants Agreement With D. U. R. Embodying Best Tayler Plan Features

Although its action is almost certain to be vetoed by Mayor Couzens, the City Council of Detroit, Mich., at the meeting on Nov. 11 adopted a resolution embodying a majority report authorizing the non-existent Street Railway Commission to begin negotiations with the Detroit United Railway for an agreement along the lines of the Tayler grant as applied in the city of Cleveland.

The majority report, signed by five members of the Council, stated that the committee of the whole had considered the report and recommendations of the Board of Street Railway Commissioners relative to the acquisition by the city of control, operation and extension of a railway system that will make possible the betterment of transportation facilities now so inadequate and unsatisfactory. In reviewing the commissioner's report it was stated that the same had included recommendations that the city begin now to build and own its subways and other rapid transit structures, and that an agreement including the best features of the Tayler service-at-cost plan be entered into with the local railway. Municipal control of operation of the enlarged system provided for in this agreement which is to be negotiated by the Street Railway Commission and to contain a purchase clause at a fixed valuation is also recommended. The purchase right is to be exercisable by the city at its own option at the end of any five-year period.

WANTS VOTE BY PEOPLE

The commission also recommended that the members be authorized to proceed on this basis and that the people be given an opportunity to vote upon this plan and at the same time upon any amendments to the city charter which the city's legal advisors may find necessary in order to make this plan legally possible. Inasmuch as the commission's recommendations merely ask that the members be authorized to negotiate with the company, and any agreement they may make would have to meet the full approval of the Common Council before submission of the matter to the people, the recommendations were concurred in by the signers of the majority report.

The resolution authorizing the Board of Commissioners to present a plan of settlement to the Common Council after negotiations with the railway in accordance with the commission's former report and recommendations was offered by Councilman Nagel. The resolution also requests the commissioners to include in any agreement which they may make, a provision that the city will build all trackage and extensions and replace all worn-out tracks and foundations so that the city shall eventually own all tracks.

A defeated minority report stated that its signers did not agree with the commissioners in their statement that the people had twice voted adversely upon an immediate and outright proposition to purchase the railway system. It further maintained that each previous proposition carried with it a franchise in some form.

A resolution was accepted and ordered laid on the table requesting that the governor of Michigan cause a special session of the Legislature to be convened during the present year for the purpose of a consideration of the question of bonding the city so that subways may be built at public expense.

News Notes

Offer to Supply Bus Service.—The Fifth Avenue Coach Company, New York, N. Y., which is controlled by the Interborough Rapid Transit Company, has issued an illustrated booklet which contains the announcement that the company is ready to supply all the motor bus service the city needs. It also said the company has applications before the city authorities for permits to place new lines in immediate operation. The officers of the company know the requirements of the city from their experience in operating buses on Fifth Avenue.

Purchase Vote Arranged.—Representatives of nine border municipalities, Windsor, Walkerville, Ford City, Sandwich, Ojibway, Sandwich East township, Sandwich West township, Anderson township, Tecumseh and Amherstburg, Ont., have decided to have the ratepayers vote on Dec. 6 on the question of authorizing the Hydro-Electric Power Commission of Ontario to purchase the Sandwich & Amherstburg Railway for \$2,039,000. The development of the plans for this purchase were reviewed at considerable length in the ELECTRIC RAILWAY JOURNAL for Nov. 8, page 873.

Bonner Freight Container System Urged.—Col. Joseph C. Bonner has filed with the Federal Electric Railways Commission a brief urging the investigation of the Bonner "through container" system for transporting freight on electric railways. This system, it is claimed, is much cheaper than by auto truck. Col. Bonner stated in his brief that one of the large railways expected to test the system, and that several hundred "through container" units and the complementary accessory rail cars and auto truck carriers are planned as the operating unit. If, through the Federal Commission, the roads can again be put on their feet, the brief urges that there will be an opportunity of developing this economic method of transporting freight, for the benefit of the transportation companies and the public. The Bonner system has been described previously in the ELECTRIC RAILWAY JOURNAL.

New Wage Contract in Charleston.—The Charleston Consolidated Railway & Lighting Company, Charleston, S. C., has signed a new wage agreement with its men, organized as a division of the Amalgamated Association. The old rates of pay were 36, 38 and 40 cents an hour. The new rates are 46 cents an hour for the first three months, 48 cents for the next nine months and 50 cents thereafter. There is a provision for time and one-half for overtime and five legal holidays, plus fourteen days vacation with full pay each year. The only provision from the absolutely closed shop is that the company reserves the right to use outside men if at any time the union fails to supply enough men. There has never been a strike in Charleston on the railway system, which has been organized since 1907, and the scale of wages under the agreement with the union in Charleston has been steadily less than in the neighboring non-union towns until the present time.

Financial and Corporate

\$430,713 Deficit

Permitted Return at Dallas Under Service-at-Cost Has Fallen Behind This Amount in Two Years

The Dallas (Tex.) Railway operating under a service-at-cost franchise, for the twelve months ended Sept. 30, 1919, earned 4.61 per cent net on the agreed valuations, as against an authorized return of 7 per cent, according to the report of Grover C. Bland, chief accountant in the office of the supervisor of public utilities. The agreed valuation of the properties of the company on Sept. 30, 1919, was \$8,560,429. This includes the valuation fixed at the time the franchise was granted, plus additions and betterments made since then.

EARNINGS AND EXPENSES COMPARED

A comparison of the earnings and expenses of the company for the first and second years of operation is shown as follows:

Gross earnings	\$564,511 Inc.
Operating expenses and maintenance and accident charges.....	498,001 Inc.
Net earnings	66,420 Inc.
Interurban Terminal net earnings.....	5,350 Inc.
Non-operating income	1,039 Dec.
Total net earnings.....	\$70,132 Inc.
Authorized return—7 per cent on property value	\$1,885 Inc.

Deficit in authorized return..... \$88,247 Dec.

The total net earnings for the two years were equivalent to a rate of return of 4.30 per cent per annum on the property value, as against a permitted return of 7 per cent, resulting in a deficit of \$430,713 in the authorized (or permitted) return for the period.

The railway gross earnings for the second year increased over the first year by an amount of \$564,511, or 34.68 per cent, due to elimination of jitney competition and a general increase in traffic. There was jitney competition during nine months of the first year of the street railway's operation under the new franchise, the abolition of the jitneys becoming effective on July 1, 1918.

The railway operating expenses and maintenance and accident charges for the second year show an increase of \$498,091, or 22.99 per cent.

The principal increases were in the items of maintenance expenditures and conducting transportation. The increase in maintenance was due to higher costs of labor and material, and to the fact that somewhat more maintenance work was done during the second year. The increase in conducting transportation was caused by higher wages to employees in the transportation department.

OPERATING RATIO HIGH

The total appropriations to the accident reserve for the two years (6 per cent of the railway gross receipts, as provided by the franchise) amounted to \$229,161, and the expenditures therefrom were \$186,501, leaving a balance of \$42,652 in accident reserve as at Sept. 30, 1919. There were no balances in the surplus reserve or repair, maintenance and depreciation reserve of the company as at this date.

The operating expense ratio was 84.03 per cent for the year ended Sept. 30, 1918, and 86.11 per cent for the year ended Sept. 30, 1919, as compared with an average operating expense ratio of 73.80 per cent for the five years immediately preceding the beginning of operation under the new franchise on Oct. 1, 1917.

RECORD OF PASSENGER TRAFFIC

During the twelve months ended Sept. 30, 1919, the railway carried 43,352,996 revenue passengers, 396,837 free passengers and 7,337,952 free transfer passengers, a total of 51,087,785 passengers. The transportation revenue per revenue passenger was 4.79 cents, and per revenue and free transfer passenger 4.09 cents.

The net earnings from operation of the interurban terminal building and facilities for the year ended Sept. 30, 1919, increased \$5,350, or 11.59 per cent over the first year. The total net earnings for the two years amounted to \$97,644, equivalent to a rate of approximately 3½ per cent per annum on the investment in the interurban terminal property.

\$106,000,000 Security Shrinkage

Receiver Reduces to Dollars and Cents Loss in Railway Security Values in New York in Ten Months

Job E. Hedges, receiver of the New York (N. Y.) Railways, addressed the New York Credit Men on Nov. 13. For the most part his remarks had to do with the problems confronting the electric railways in New York City. He said that the great difficulty with the problem was that for a year and a half public opinion had not been adequately expressed. He wanted to know why the credit men, men of faith and credit, had been civilly silent so long.

MR. HEDGES GIVES DETAILS

One of the matters with which Mr. Hedges had recently concerned himself was that of the shrinkage in security values of the railway attributable to the present unsettled condition with respect to some definite program of relief for the railways. On this point he said:

I took pains to-day to secure figures on the loss of traction values consequent upon a refusal of the Mayor to recognize facts as part of the problem. I found the following shrinkage in values by virtue of the non-expression of the thinking people of this city: Interborough 5 per cent and 7 per cent notes, \$30,000,000; Interborough collateral bonds, \$12,000,000; Manhattan Railway stocks and bonds, \$26,700,000; New York Railway two issues of bonds, \$3,371,000; Brooklyn Rapid Transit bonds and notes, \$28,471,000. Facts are dangerous to fool with if you have never had an intimate acquaintance with them. When one accepts another's theory for facts, his mind is likely to be confused in logical sequence. This shrinkage in value has come about in order that a foolish theory may be imposed by unthinking men on thinking men who are mentally dormant.

It is my aim that government functions shall not be fogged by the impotency of men charged with creating public opinion.

I recently suggested in a lawful manner by letter to a superior officer what I thought his lawful duties were, and my letter was sent to the District Attorney with the suggestion that I be indicted for trying to have an effect on his official mind.

Mr. Hedges explained that the shrinkages to which he referred were from Jan. 2 to Nov. 10.

Affairs Again Tangled

The Purchase Payments Not Made for Southern Traction and Security Holders Seeking Redress

Further legal complications are threatened in the already badly tangled affairs of the Southern Traction Company, East St. Louis, Ill., in an appeal of a group of stockholders against the ruling made in the United States Court that holders of stock issued during the period the company was in the hands of receivers shall not participate in the money realized at the recent sale of the property.

PROMOTER BEHIND IN PAYMENT

Furthermore H. D. Mepham, the original promoter of the road, on whose bid of \$400,000 the property was knocked down three months ago, has failed to make the two payments due in October of \$30,000 each and the final payment of the purchase price on Nov. 1. It is expected that an application for a resale of the property will be made in United States Court at East St. Louis.

The appeal from the decision of Judge English which barred the holders of certain securities of the company has been filed in the United States Court of Appeals at Chicago. Corporations and individuals who delivered goods to the road and rendered other services and whose claims aggregate \$31,500 have joined in the appeal to the court. Among others who are expected to join in this appeal is Assistant Attorney General William E. Trautman, who holds about \$50,000 in accumulated claims.

When the road was knocked down to Mr. Mepham he paid \$30,000 "earnest money." If he fails to make good on his final payments, which are now overdue, this sum will be held to pay the expenses of the two sales. Mr. Mepham has paid \$75,000 in all, which may go by default if he does not fulfill his contract.

BEFORE THE COURTS SINCE 1914

The affairs of the Southern Traction Company have been in the courts since 1914, when the company became involved after more than \$1,500,000 had been spent in construction work. Former United States Senator William Lorimer, Chicago, who was the head of the Lorimer-Gallagher Construction Company, which built the road for the most part from East St. Louis to a point just beyond Belleville, lost much money in the enterprise before he suffered financial eclipse in the failure of the LaSalle Street Trust & Savings Bank, Chicago, of which he was president.

Interest in financial circles now centers in the possible resale order. In the first sale Mr. Mepham outbid Judge E. C. Kramer, who was acting for a group of St. Louis financiers. This group, it is expected, will bid again for the road if it is offered for resale.

Fate of Eastern Massachusetts Branches Decided

The Randolph-South Braintree Street Railway, a branch of the Eastern Massachusetts Street Railway, Boston, Mass., will be discontinued after Nov. 21.

The proposed abandonment of the Danvers-Putnamville line of the Eastern Massachusetts Street Railway has been postponed. By a vote of about two to one the citizens abolished jitney licenses. The Eastern Massachusetts Street Railway has reduced the fare on the Danvers-Salem line to nine tickets for \$1.

\$5,000,000 Subway Deficit in New York

**Engineers Report that Based Upon Present Prices Lines Will Fall
\$8,800,000 Short by June 30, 1920, on Five-Cent Fare**

The report and analysis of the Interborough Rapid Transit Company, New York, N. Y., which the engineering firm of Day & Zimmermann, Inc., has been making for the committee for the Interborough Rapid Transit Company first and refunding mortgage 5 per cent bonds and the three-year secured convertible 7 per cent notes have been completed, and the secretary of the committee, William Ewing, sent out copies of the report to all bondholders on Nov. 22.

J. P. Morgan is chairman of the committee. As explained previously in the *ELECTRIC RAILWAY JOURNAL* it was deemed advisable to organize a committee in the interest of the security holders mentioned, but no deposits have been requested.

The engineering firm was engaged in February to make the examination. It completed its efforts in June, before the award of the 25 per cent wage increase to Interborough employees. The engineers then revised the report to incorporate in the analysis the effect of the increased wages.

ADVICE TO SECURITY HOLDERS

The committee, in its letter to holders of bonds and notes, said that "although it is impossible for the committee to predict with certainty the future trend of operating costs or the position the city will finally take with regard to increased fares, it is of the opinion that investments in both bonds and notes will ultimately be protected, and, therefore, recommends that the holders refrain from sacrificing such securities."

The report has been summarized as follows:

The corporate history of the Interborough is unusually free from those complexities which have resulted from circumstances incident to the growth of most transportation properties serving large communities. All the subways in operation have been constructed new since 1900, and the disbursement of the proceeds from the sale of the 5 per cent bonds and 7 per cent notes (approximately \$200,000,000), and the investment by the city (approximately \$159,000,000), has at all times been subject to the supervision of public authorities and is a matter of public record.

The report shows the physical property is in good condition throughout, and well maintained in spite of the difficulties which the management has encountered through and subsequent to the war, and that the results of its operations with an unparalleled record of safety could not have been achieved but for the highly efficient organization which the company has created and maintained throughout the period of its activities.

The operating ratio increased from 45.6 per cent in 1910 to 67.9 per cent in 1919, equivalent to approximately \$10,000,000. Of this amount \$6,000,000 is accounted for directly by the increase in wages and \$3,000,000 by the increased cost of coal and other supplies. These figures do not include the increase in wages of Aug. 17, 1919, equivalent to approximately \$5,000,000 annually.

The report shows that if 1916 unit costs had remained in effect, the Interborough Company would have passed successfully through the remaining period of construction as estimated when the contract with the Gaynor administration was negotiated.

During the year ended June 30, 1919, the company was experiencing the increasing costs generally prevailing owing to conditions growing out of the war, but it was not until the following year that these increases became serious. In the early part of the fiscal year 1919, a wage increase (separate from and prior to the 25 per cent increase made in August, 1919), was granted amounting to approximately \$3,000,000 annually.

The effect of this increase, together with increased costs of materials and supplies, notwithstanding the fact that gross earnings for the year ended June 30, 1919, increased \$2,700,000 over the year 1918, resulted in a decrease in net earnings, after the payment of operating expenses and taxes, from \$18,219,000 to \$14,447,000, a loss of nearly \$4,000,000.

Also, during this year the interest and sinking fund on the 5 per cent bonds and 7 per cent notes chargeable to income amounted to \$9,215,000, an increase of almost \$4,600,000, the result of the opening of the Seventh Avenue and Lexington Avenue subways

and other extensions. The deficit in this year, of \$3,810,000, was the direct result of the foregoing conditions.

The report includes estimates for the future up to and through the year ending June 30, 1924, all of which estimates are based on the continuance of the 5-cent fare and present costs of materials and supplies. The report indicates that even with the 5-cent fare, provided unit operating costs prior to the last wage increase had remained the same through the next five years, the company could have earned in the year 1924 its fixed charges for that year, excluding, however, any return on the \$100,000,000 invested by the city under Contract 3.

The wage increase of Aug. 17, 1919, has changed the situation completely. This increase adds approximately \$5,000,000 annually to the operating expenses. Through the five-year period ending June 30, 1924, it is estimated that the accumulated deficit, as the result of the conditions mentioned above, would amount to about \$40,000,000.

The report shows that on Oct. 31 of this year the cash position of the company will be such that approximately \$5,000,000 will have to be provided from some source other than operating income that the company may meet the rentals and fixed charges payable on Jan. 1. For the fiscal year ending June 30, 1920, it is estimated, based on present prices of wages, materials and supplies, and the continuance of the 5-cent fare, that the company will fall short of meeting its fixed charges (including rentals) by approximately \$8,800,000.

It must be borne in mind in connection with the foregoing estimates that present unprecedented costs have been made the basis of estimates, and while it is impossible to forecast the future it is obvious that any decrease in operating expenses would be reflected directly in an equivalent increase in the sum available for interest and sinking fund on the outstanding 5 per cent bonds and 7 per cent notes.

Increase in Philadelphia Net

The Philadelphia (Pa.) Rapid Transit Company on Nov. 17 made public the following statement of earnings:

	1919	1918
Operating revenue	\$3,165,552	\$2,411,983
Operation and taxes	2,140,411	1,794,717
Operating income	\$1,025,141	\$617,267
Non-operating income	45,216	50,202
Gross income	\$1,070,357	\$667,470
Fixed charges	513,550	806,395
Net income	\$250,806	*\$138,025
* Deficit.		

	1919	1918
Ten Months Ended October		
Operating revenue	\$29,160,983	\$25,535,542
Operation and taxes	20,029,040	16,883,760
Operating income	\$9,131,942	\$8,651,775
Non-operating income	441,311	520,480
Gross income	\$9,573,254	\$9,172,255
Fixed charges	8,109,405	8,017,458
Net income	\$1,463,758	\$1,154,797

Reorganization Plan Changed

Changes in the plans of the reorganization committee having in charge the financial affairs of the Oakland & Antioch Railway, Oakland, Cal., are indicated in a supplemental petition filed with the Railroad Commission on behalf of the San Francisco & Sacramento Railroad, the new corporation formed to take over the Oakland & Antioch lines. The new plans provide that the rate of interest on the bonds to be issued by the new corporation is not to exceed 7 per cent, and that the bonds to be issued in accordance with the reorganization scheme are to mature in five years instead of twenty, as was originally contemplated. The total authorized bond issue will be \$3,000,000 par value, of which not to exceed \$2,100,000 will be issued forthwith. The remainder of the bonds are to remain in the treasury and are to be issued only for the purpose of acquiring new properties or for defraying costs of additions, extensions or betterments, the bond sale to be made only upon approval of the commission.

Of the \$2,100,000 of bonds to be issued forthwith the bondholders of the Oakland & Antioch Railway, Oakland, Antioch & Eastern Railway and San Ramon Valley Railroad, as provided in the original plan, are to receive \$1,300,000. The balance of \$800,000 is to be sold at a figure to net the company not less than \$720,000, nor more than \$732,000. The proceeds from the sale of the bonds are to be utilized to pay off prior liens, non-assenting bondholders, to provide working capital for the company, to meet reorganization expenses and to pay costs of extensions, additions and betterments.

Receivers for Interstate Road

William L. Doyle, Easton, Pa., has been named receiver of the Northampton, Easton & Washington Traction Company, Easton, Pa., in a suit for foreclosure brought by the Bankers' Trust Company, Easton. There will be a hearing to show cause why the receiver should not be continued permanently.

The mortgage against the railway under which the bank acts as trustee amounts to \$536,000. The traction company, it is alleged, executed a mortgage with the trust company covering all its personal property and real estate to secure a bond issue on May 1, 1910. The railway is charged with failing to pay \$13,400 interest due on Nov. 1, 1919.

The inability of the railway to meet its obligations was brought about by operating and financial difficulties. A short time ago the employees of the company went on strike for an increase in wages. The company said it could not grant the increase because of having lost \$20,000 per month on the operation of the 18 miles of road. The company then ceased operations. Officials say that the road will probably be dismantled.

Mr. Doyle, the receiver, is treasurer of the railway.

Intervening Petition in St. Louis Suit

An intervening petition has been filed in the United States District Court in behalf of George E. Vail in the suit of John W. Seaman against the United Railways, St. Louis, Mo. The petitioner charges among other things that by means of a voting trust the legal control of the company was bartered away from the majority of the stockholders. It further alleges that company officials by use of company funds, sought to influence legislation.

The petition reviews the consolidation of the fourteen companies operating in St. Louis in 1898 by the St. Louis Transit Company, which afterward became the United Railways. It is alleged that these companies had an investment of \$5,000,000 or less and that on this actual value \$15,000,000 of bonds were issued, for which no adequate consideration was secured, and \$25,000,000 of stock, on which the stockholders still owe \$20,000,000.

The petition demands an accounting by the directors of the company and its officials, the return to the company's treasury of 250,000 shares of common stock and 163,832 shares of preferred. It also asks that the outstanding bonds be declared to have been issued fraudulently.

Judge Dyer has referred the intervening petition to Henry Lamm, master in chancery, who has been hearing evidence in the United Railways case.

Charles W. Bates, attorney for the receiver, said he was not acquainted with Mr. Vail or the contents of the suit. He would make no comment.

Melbourne Lines Prosperous

Although Operating Costs Have Increased
Materially the Cable Lines of
Australia City Do Well

The Tramway Board of Melbourne, Australia, in its third annual report covering cable and horse tramway operation for the year ended June 30, 1919, states that notwithstanding the heavy loss of traffic due to the influenza epidemic of some months ago and more recently to the industrial unrest the passenger revenue showed an increase over the previous year of nearly 7.5 per cent. The increase, however, was more than absorbed in the greater cost of operation due to higher costs of fuel, supplies and a wage increase which was retroactive to Mar. 1, 1919. The operating ratio increased from 56.6 in 1918 to 61.21 in 1919. The system operates 44.3 miles of double-track line and serves a population which is estimated at 450,000.

OPERATIONS COMPARED WITH PREVIOUS YEAR

		+ Inc. - Dec. 1918
Passenger revenue	£944,209	+ £42,795
Non-operating revenue	1,530	
Total revenue	£945,739	
Maintenance expenses	£53,226	
Power expenses	118,650	
Transportation expenses	344,060	
General expenses	35,323	
Total operating expenses	£554,265	
Net operating revenue	+391,534	
Taxes and car licenses	27,691	
Reserves, etc.	135,000	
Surplus	£228,843	

Traffic statistics:		
Tram miles	13,149,637	+316,203
Tram hours (estimated)	1,460,000	
Schedule speed in m. p. h.	9	
Revenue passengers carried	118,302,781	+4,203,024
Special concession tickets	102,864	
Free tickets to 1914 returned soldiers, sailors, and nurses on furlough	248,340	
Number of employees		
June 30	2,400	+125
Cars owned	547	-2
Dummies owned	539	+24
Av. Max. No. trains operated daily	429	
Scale of fares	1d., 1½d., 2d., 3d.	
Average distance in miles for a penny fare	1.628	

Pursuant to the provisions of the Melbourne & Metropolitan Tramways act of 1913 the surplus of revenue over expenditure between Jan. 8 and June 30, 1919, (£250,000) was credited to the Melbourne and Metropolitan Municipal loans redemption fund in addition to £250,000 which was transferred from the "tramway fund." Amounts of £100,000 have also been respectively credited to the renewals and reconstruction reserve funds.

The electric lighting of the cable cars from storage batteries, which was delayed by the non-delivery of equipment for the charging stations, is now being pushed to completion. It is said that the installation is much appreciated by the traveling public and it is believed that the expenditure should be amply justified by the results obtained.

A new agreement with the Australian Tramway Employee's Association supplementing the one that expired on Dec. 2, last, was entered into after extended negotiations and subsequently filed at the court of conciliation and arbitration. This agreement, which runs until May 1, 1922, provided increased wages averaging one shilling per day, additional annual holiday leave, extra payment for "spread of hours" and holiday work. On Peace Celebration Day double time is granted to all workers.

A summary of revenues and expenses arranged to agree with the I. C. C. classification system is presented herewith.

Cities Service Earnings Increase

Earnings of Cities Service Company, New York, N. Y., for October, 1919, show a fair increase over the preceding month, indicating that the improvement in earnings noted in the September statement is still continuing.

Gross earnings of the company for October, 1919, were larger by \$37,756 than for September, while the amount available for payment of dividends on the preferred stock for the month increased \$40,451. The balance available for reserves, dividends on the common stock and surplus for October showed a gain of \$38,987 over the preceding month, and an increase of \$195,820 over the balance for August, 1919.

In conformity with the policy announced in May, 1916, the directors at their November meeting increased the rate of stock dividends being paid on the common stock from 12 per cent to 15 per cent annually by declaring a monthly dividend of 1¼ per cent on the common stock, payable in common stock at par on Feb. 1, 1920, to stock of record Jan. 15, 1920. The board also declared the regular monthly dividends, payable in cash, of one-half of 1 per cent on the preferred stock and one-half of 1 per cent on common stock, both payable on Feb. 1, 1920, to stock of record Jan. 15, 1920.

In 1916 and 1917 the Cities Service Company paid 6 per cent in stock dividends on the common stock, in 1918 9 per cent was paid on the common stock in stock dividends, and the present rate of payment of these dividends is 12 per cent.

The directors at the meeting also approved the issue and sale of the \$3,000,000, par value, preference B shares recently offered to stockholders of Cities Service Company, which offering was heavily over subscribed, and declared the initial monthly dividend on the 6 per cent cumulative preference B shares of one-half of 1 per cent payable on Jan. 1, 1920, to shares of record Dec. 15, 1919.

Public Utility Security Outlook

Despite adverse conditions affecting public utilities arising from war prices and fixed rates and fares, these corporations, says the *Wall Street Journal*, have been able to do considerable financing recently by means of stock issues sold to the public. The total amount of stock sold by public utilities corporations so far in 1919 is \$53,601,490. This compares with \$614,858,600 preferred and \$514,948,500 common stock sold by industrial corporations.

Many utility corporations, particularly traction and gas companies, says the same authority, are in need of money for expansion purposes, but owing to their curtailed earning power wherever they have been obliged to operate under rates and fares which prevailed before the war, financing cannot be successfully promoted at present time. The situation, however, is slowly but surely improving and through courts and public utility commissions many of the companies have been authorized to increase rates and fares to meet higher operating costs.

With improvement in the general situation it is expected that much new financing will be done by public utilities and their securities which have always as a class been regarded highly in peace times, will eventually work back to their former position.

Virginia Railway Net Declines

With 30 Per Cent Increase in Expenses
the Net Revenue, Even with 12 Per
Cent Increase, Declines

The annual report for the year ended June 30, 1919, of the Virginia Railway & Power Company, which operates electric railway, gas and electric utilities in Richmond, Portsmouth and Norfolk shows that the railway contributed 55.2 per cent of the total earnings, at an expense of 60 per cent, although the operating ratio of the railway alone was only 69.5 per cent.

In addition to the current charges for way and equipment maintenance, which increased 4.95 per cent over the previous year, the company set aside an amount equal to 6 per cent of the gross revenue for depreciation, thus continuing the policy established eight years ago. Only one cash dividend of 3 per cent was paid on the preferred stock, due to the necessity for conserving cash resources for making extensions and improvements.

To provide in part for additional facilities required on account of government activities two loans were secured, one of \$500,000 from the U. S. Shipping Board, which was used in the installation of additional power house equipment, and the other from the U. S. Housing Corporation of \$300,000, for the purchase of fifty cars. Both of these loans are to be repaid in equal annual installments beginning one year after the declaration of peace.

The results of the year's railway operations compared with those of the preceding year were as follows:

	June 30, 1919	- Dec. + Inc.
Revenues:		
Passenger	\$4,569,524	+ \$500,932
Freight	41,707	+ 17,343
Mail	1,069	+ 124
Non-operating	35,610	+ 5,500
Total railway revenue ..	\$4,647,910	+ \$499,315
Operating expenses:		
Way and structures	\$482,798	+ \$150,985
Equipment	349,871	+ 115,583
Traffic	6,819	+ 1,296
Transportation	1,922,004	+ 427,055
General	431,030	+ 19,543
Total operating expenses ..	\$3,222,322	+ \$741,875
Net operating revenue (Ry.) ..	\$1,425,588	- \$252,570
Taxes and licenses	\$354,969	+ \$57,359
Statistics of operation:		
Revenue passengers	91,556,392	+8,910,643
Transfer and free passengers ..	18,189,790	+1,035,566
Total passengers	109,746,182	+9,946,209
Car miles run	13,693,601	- 515,229
Car-hours operated	1,638,725	- 30,890
Kw.-hr. used	48,022,532	-2,133,223

At the end of the fiscal year the company operated 177.7 miles of route having a total of 255.09 miles of single track, of which 15.22 were sidings. Three hundred and thirty-one double-track and 228 single-truck passenger cars were owned, the majority being of the semi-convertible type. In addition forty-nine service cars of various types belonged to the company. During the year thirty-five new single-truck "safety cars" with equipment and one interurban car were purchased and six single-truck open cars were converted into double-truck trailers, all of which are included in the above totals.

No main track extensions were constructed during the year in Richmond and vicinity although several sidings were extended and rearranged with a net increase in single-track equivalent of 0.241 miles. In the Norfolk and Portsmouth division 2,583 miles of single track equivalent were constructed, 2,384 miles abandoned and removed and 5,533 miles of standard gage were changed to wide-gage. In addition to that made necessary by the rebuilding of tracks 38,038 yards of new paving was laid.

Merger Proposed

Plan Advance for Raising Money and Consolidated Suburban Lines at Cincinnati

B. H. Kroger, head of the Cincinnati, Milford & Lebanon Traction Company, Cincinnati, Ohio, according to the Cincinnati *Enquirer*, has confirmed reports that he has been considering a proposition to merge that traction line with the Cincinnati & Columbus Traction Company. The merger hinges upon one development—the ability of the citizens of Hillsboro, Ohio, acting in conjunction with Cincinnati business men, to raise \$425,000.

On Oct. 25, acting upon permission granted by the Ohio Public Utilities Commission, the Cincinnati & Columbus Traction Company abandoned service between Hillsboro and Owensville, but continued to operate that part of the line between Owensville and Norwood. It is understood that if the merger is accomplished the connection at East Norwood will be abandoned and passengers will be brought to Cincinnati via Madisonville. In confirming the report Mr. Kroger is reported to have said:

Citizens of Hillsboro submitted the merger proposal to me a few weeks ago. They were told that it would be necessary for them to raise \$425,000 to bring about the rehabilitation of the Cincinnati & Columbus line and the installation of new light cars. This proposition was presented to the public utilities committees of the Chamber of Commerce and the Business Men's Club. The local committees were asked to see about raising \$300,000 in Cincinnati and \$125,000 in Hillsboro, with which to purchase the property of the Cincinnati & Columbus Traction Company.

Under the plan the Cincinnati, Milford and Blanchester road would give as security \$425,000 first mortgage bonds of the Cincinnati & Columbus Traction Company and \$400,000 first mortgage bonds of the Cincinnati, Milford & Blanchester Company.

If the merger is effected both the present power plants of the two lines would be abandoned and the current supplied by the Union Gas & Electric Company.

Shore Line Abandonment Before Superior Court

The Shore Line Electric Railway, Norwich, Conn., was recently ordered by the Public Utilities Commission to install and to supply at least hourly service daily in each direction between New Haven and Saybrook Junction. The inadequacy of transportation service between New Haven and Saybrook Junction was brought to the attention of the commission Oct. 15 in a petition from residents of Clinton, Madison, and Guilford.

In its finding the commission states that the Shore Line Electric Railway has never been excused or relieved from operating either by the commission or by the court and that no facts have been presented to the commission warranting a suspension of the service. The commission assumes that the temporary receiver is authorized by the court to operate the company's lines, "but has not the arbitrary power of operating only such lines as he may select and to refuse to render service on the other lines."

In commenting upon the order of the commission to restore at least hourly service in each direction between New Haven and Saybrook Junction, Receiver Robert W. Perkins of the Shore Line Electric Railway said:

I suppose it is up to me now to satisfy the Public Utilities Commission that this section of the Shore Line cannot be operated without material loss to the company. Under the receivership the court has directed that there shall be no operation of divisions of the road except at a profit.

The order to the Shore Line did not become operative until Nov. 24.

Meanwhile an application was filed by Mr. Perkins with the clerk of the Superior

Court of the New London County, asking for an order discontinuing service on the lines operated by the Shore Line Electric Railway between New Haven and Saybrook Junction. He stated that when the company ceased operating its lines on July 16 it had been operating with continual and large financial loss for some time. He further says that the cost of operating these lines has not materially decreased since that date, and that a large financial loss would entail should any effort be put forth by the receiver to operate the line at this time. He has petitioned the court to pass an order authorizing the discontinuance of service on this line and each of its aforementioned branches. The court fixed upon Dec. 2 as the date for a hearing at Norwich, Conn.

Various United Railway Details

A report filed during the week ended Nov. 15 by Rolla Wells, receiver for the United Railways, St. Louis, Mo., in the United States District Court for last September shows that the cash on hand at the end of the month had been reduced by \$349,086 over the amount on hand at the end of the previous month.

The balance on Aug. 31 was \$1,010,543. Receipts during September were \$4,423,509. Disbursements totaled \$4,772,596. The balance on Sept. 30 was \$661,456. The receipts included \$2,254,000 from the sale of receiver's certificates, negotiated to replace a matured bond issue, \$1,344,609 from conductors and \$17,050 from employees as payments on Liberty Bonds. The disbursements include \$2,521,484 for operating expenses, prior to the appointment of the receiver April 12, last, and \$314,145 for operating expenses during September.

Special Master Lamm, who is inquiring into the affairs of the company subject to the court's sanction, has approved the application of the receiver to pay \$667,550 bond interest due Jan. 1 and \$83,165 bond interest due Feb. 1. He has also approved the expenditure of \$621,910 for reconstructing about 25 miles of track; \$2,427 for the construction of a snow sweeper, and \$1,095 for the construction of fire escapes in the general office building of the company.

Judge Dyer denied the application of Attorney Ephraim Caplan, representing certain stockholders of the company, to have special counsel appointed to represent the company at a hearing before the Public Service Commission on Nov. 23, in regard to the increase in price of electric power under contracts with the Union Electric Light & Power Company. Judge Dyer told Attorney Caplan the hearing would be open and that he had no doubt the commission would be glad to receive any information that might be offered.

Foreclosure Bill Filed Against Aurora-Elgin

A bill of foreclosure against the Aurora, Elgin & Chicago Railroad Company, Wheaton, Ill., of which Joseph K. Choate was recently appointed receiver, has been filed in Judge Evans' court at Chicago by the Northern Trust Company, trustee for the holders of the underlying bonds of the company. Under the new order of the court Mr. Choate has been reappointed receiver. The same personnel of officials remains. No statement has as yet been made regarding the date of the sale of the property.

Poor Outlook for Brooklyn

Bankers Who Represent Security Holders See Little Hope for Some Time to Come Under Present Conditions

Kuhn, Loeb & Company and Kidder, Peabody & Company, New York, N. Y., comprising the protective committee for Brooklyn Rapid Transit 5 per cent and 7 per cent notes and New York Municipal Railway Corporation 5 per cent bonds, the Central Union Trust Company having resigned from the committee because of possible conflict with its duties as trustee of the first refunding mortgage, has sent out to bond and noteholders a report outlining the situation as represented by the report of Stone & Webster and Price, Waterhouse & Company, who were employed to investigate the properties and accounts of the system. The circular says in part:

As a result of greatly increased costs due to the war, the city's delay in completing the new rapid transit lines and other causes, it became necessary to provide a large additional sum to meet the system's obligations under the city contracts, including both equipping the new lines and completing the addition to the power plant, which had been commenced to provide power for the new rapid transit lines. This money was provided by the issue and sale of \$18,000,000 of the B. R. T. receiver's 6 per cent two year certificates. The proceeds of \$5,000,000 of these certificates have been retained by the B. R. T. receiver mainly for power development, the proceeds of the remaining \$13,000,000 being advanced for use by the rapid transit company's receiver under the city contracts. Against this advance the rapid transit companies' receiver has issued \$13,000,000 of receiver's certificates secured by a lien upon all the properties of those companies prior to the subway bonds and junior to the underlying bonds, these certificates being in turn pledged to secure the B. R. T. receiver's certificates.

Stone & Webster advise that, assuming that there will be no further important advance in wages or cost of materials, the proceeds of these certificates, with such part of the income as is available for the purpose under the decree, will be sufficient to meet the terms of the contract with the city and that, provided the city does its part with reasonable promptness, all of the rapid transit lines provided for in the city contracts should be equipped and in full operation before the maturity of the certificates.

As a result of the investigation of Stone & Webster it became apparent that the surface lines of the system would be unable to earn their fixed charges, despite the 2-cent charge for transfers, recently allowed by the Public Service Commission, and they now report that with the increased scale of wages and disregarding the effect of the disintegration which has occurred these companies cannot earn during the current fiscal year, and probably for some time thereafter will be unable to earn even operating expenses and taxes.

A receiver for the surface lines was appointed by the United States District Court in July and defaults in payment of the interest on practically all the mortgages resting upon those lines have occurred. Following default in the payment of rental to Brooklyn City Railway that company has taken possession of its lines, comprising about 40 per cent of the surface mileage of the system, which had been operated by a subsidiary of the B. R. T. Company under lease. The result has been a general breaking up of the system of surface lines formerly controlled by the B. R. T. Company. How far this will affect the earnings of the lines is still problematical.

The activities of the receiver of the B. R. T. Company proper are now, in general, confined to completing the additional power generating facilities and furnishing power and doing repair and maintenance work for both the rapid transit and surface lines. Under a contract negotiated by the receiver he will also furnish power for the future operation of the Brooklyn city lines. Stone & Webster report that while this part of the system is earning and will probably continue to earn interest on the B. R. T. Company's investment therein there will be no substantial surplus over such interest.

As appears from the reports of Stone & Webster, with the wages and other operating costs now in force and a 5-cent fare, the earnings of the rapid transit lines remaining after the payment of interest upon the receiver's certificates and the \$22,967,000 of underlying elevated bonds, will fall considerably short of the interest upon the \$60,000,000 of B. R. T. notes and subway bonds. As already stated, without an increased fare no substantial contribution toward your interest can be expected from the surface lines or from the properties of the B. R. T. Company proper.

There have now been deposited with the committee about \$30,000,000 of the three-year notes, which, together with the \$16,544,700 of that issue held by the War Finance Corporation constitute over 80 per cent of the entire amount outstanding. The committee also represents the majority of the subway bonds outstanding.

War Finance Loan at New Orleans Unpaid

The future course of the War Finance Corporation with respect to the loan which it made some time ago to the New Orleans Railway & Light Company, New Orleans, La., will depend upon the tenor of the inquiry now being conducted by the corporation into the affairs of the railway. This has been made plain by A. W. McLean, managing director of the War Finance Corporation. The loan was for \$1,000,000. It fell due on June 1, but was not paid. Up to the present time the interest has been paid, also \$215,000 on account of the principal. The receiver of the New Orleans company is understood to have agreed, subject to the approval of the court, to pay an additional \$50,000 on account of the principal by Dec. 15 and a further sum of \$75,000 by Jan. 10, 1920. Mr. McLean is quoted as follows:

Repeated negotiations have been carried on by the office of the War Finance Corporation with the receivers and other parties interested for the purpose of obtaining larger payments on the loan from the revenue derived from the increased fare ordinance adopted by the city, which expressly provided that the net increase in revenue arising from the increased fare should be devoted exclusively to paying the debt due the War Finance Corporation. The receiver claims that the return from the net fare ordinance was very small, while the officers of the War Finance Corporation claim that they have not received the total amount accruing from this source.

At a conference held on Oct. 31 between the receiver and parties interested in the company's obligations and also the War Finance Corporation, it was understood that the War Finance Corporation should send public utility experts to make a full examination of the records, books and properties of the railway company and report to the War Finance Corporation in order to enable it to determine what additional amounts are due it from the increased fare. After the War Finance Corporation receives the report of its experts it will decide upon its future course of procedure.

\$100,000,000 of Second Preferred Authorized

At the special meeting of the security holders of Cities Service Company held on Nov. 17, at Dover, Del., the stockholders approved the creation of an authorized issue of \$100,000,000 of second preferred stock, of which \$40,000,000 will be of \$10 par, and will be known as preference B stock, and \$60,000,000 will be of \$100 par, and will be known as preference BB stock. The stockholders also approved the amendment to the charter of the company which provides that the company shall have the right to redeem all or any part of the present preferred stock at 112, and that all or any part of the second preferred stock may be redeemed at 106. The third amendment to the charter of the company in respect to investments from the proceeds of securities junior to the present preferred stock, was approved.

Of the new preference B stock of \$10 par, only \$3,000,000 will be issued at present, this amount having already been offered to stockholders of Cities Service Company for their subscription at \$7.50 a share. The board of directors of the Cities Service Company in offering this small amount of preference B stock did so with the idea of making this stock known to the investing public, establishing a market for it, and learning whether it would be as popular among investors as were the bankers' shares. The offering of 300,000 shares of this stock was largely over-subscribed, and subscriptions were received from more than 3500 persons, thus indicating an even more widespread demand for this stock than there was for the initial issue of bankers' shares, which were distributed to slightly

more than 1000 holders of record on their initial offering, although since that time the number of stockholders of record of Cities Service Company bankers' shares has grown to almost 5000.

No Dividend Action Planned

With reference to a report in circulation that the Ohio Traction Company, Cincinnati, Ohio, would in the near future issue interest-bearing scrip for the accumulated back dividends on the preferred stock of that company W. Kesley Schoepf, president of the company is reported to have said:

My attention has been called to this report regarding the possibility of the issuance by the Ohio Traction Company of scrip to pay the accumulated back dividends. No consideration has been given to such a procedure, nor is it in contemplation. The report has probably grown out of statements, although unofficially made, that the present rate of fare would prove sufficient to meet the requirements under the revised ordinance under which the Cincinnati Traction Company is operating.

This may be true in so far as the current requirements are concerned, but there is an accumulation of quite a large deficit that must be taken care of in some way. Whether, with this deficit out of the way, the 7-cent fare is sufficient will be determined by the results of operation in the months of October and November, and even if this should prove to be true, the company has not developed any plans along the line reported.

Financial News Notes

Lake Shore Earnings Improve.—The Lake Shore Electric Railway, Cleveland, Ohio, reports gross earnings of \$232,645 for September, 1919, compared with \$216,052 for the same month of 1918 and a surplus of \$35,831 for September, 1919, as compared with \$29,593 for the same month of 1918. For the nine months from Jan. 1, 1919, to Sept. 30, 1919, the same company reports gross earnings of \$1,940,762 as compared with \$1,638,730 for the similar period of 1918 and a surplus of \$225,409 for the nine months of 1919 as compared with a surplus of \$145,937 for the similar period in 1918, or a gain of \$79,471.

Municipalities Arrange to Run Road.—At a conference held in Attleboro, Mass., on Nov. 12, an agreement was reached whereby the operation of the Norton, Attleboro & Taunton Street Railway will be conducted by the towns of Attleboro, Mansfield and Norton and the city of Taunton. Each municipality will choose three men to form a council of twelve which will comprise the board of management. Until this board is named the operation will be conducted by the present management. The purchase price which will be raised by the municipalities is \$120,000. The outstanding debts amount to \$53,413. There are no court claims against the road.

Olean Company Without Resources.—The Western New York & Pennsylvania Traction Company, Olean, N. Y., has no financial resources, claims President Wilson R. Page. The claim was made in an examination of the company in supplementary proceedings to execution of a judgment against the company. Patrick S. Collins was referee. The judgment was obtained by Thomas A. Flynn against the company for \$750 for injuries received in

a wreck in Vandalia in December, 1917. The object of the examination was to learn whether the company has any property that can be reached to satisfy the judgment. The railway was tied up several weeks by a strike. The course that the labor troubles took were reviewed previously in the ELECTRIC RAILWAY JOURNAL.

Reorganization Plan Approved.—The Public Service Commission for the Second District of New York has approved the plan for and authorized the reorganization of the Buffalo Southern Railway, Buffalo, N. Y., under a petition by Robert B. Austin, William J. Wheeler and Edward L. Frost representing the bondholders' committee. The reorganization plan provides for a new company, the Erie County Traction Company, Inc., taking over the property and franchises of the Buffalo Southern Company. The new company proposes to issue \$450,000 in capital stock and \$100,000 in bonds. Application will be made by the new company to the commission for approval of operation and for authority to issue stock and mortgage bonds. The system of the Buffalo Southern Railway consists of 25 miles of road extending out of Buffalo.

\$1,750,000 of Notes Offered.—William A. Read & Company and Tucker, Anthony & Company, New York, N. Y., are offering for subscription at 98½, and interest to net about 6.75 per cent \$1,750,000 of collateral trust 6 per cent convertible gold notes of the Manchester Traction, Light & Power Company, Manchester, N. H. The notes are dated Nov. 1, 1919, and are due Nov. 1, 1922. The notes are issued to refund \$1,500,000 of two-year 6 per cent notes due on Jan. 1, 1920, and for other corporate purposes and are the direct obligation of the Manchester Traction, Light & Power Company, specifically secured by deposit with the trustee of \$2,059,000 of first refunding mortgage 5 per cent bonds due in 1952. The bankers announce that they will take the 6 per cent notes of the company maturing on Jan. 1, 1920, in exchange at 100 and interest.

\$4,500,000 of Notes Offered.—The Illinois Trust & Savings Bank, Chicago, Ill.; the Continental & Commercial Trust & Savings Bank, Chicago, Ill.; Montgomery & Company, New York, N. Y.; Bonbright & Company, New York, N. Y., and H. M. Byllesby & Company, Chicago, Ill., are offering for subscription at 99 and interest, to yield 7.5 per cent, \$4,500,000 of 7 per cent convertible sinking fund secured notes of the Standard Gas & Electric Company dated Nov. 15, 1919, and due Nov. 15, 1921. Pledged as collateral security for the notes will be \$2,280,000 par value, of bonds and notes, \$1,160,000, par value, preferred stock, and \$1,150,000, par value, common stock of Standard Gas & Electric's public utility properties, together with \$1,000,000, par value, 7 per cent preferred stock and 110,000 common shares of no par value of Shaffer Oil & Refining Company represented by voting trust certificates. The common stock of the latter company so pledged as collateral represents a majority interest in that issue. The company places the value on the collateral of over \$9,000,000, or twice the amount of the note issue. The notes are convertible at the option of the holder into either preferred or common stock of the Standard Gas & Electric Company at the rate of \$100 principal amount of notes for \$100 par value of preferred or common stock with adjustment of accrued interest and accrued dividend. The notes are in the denomination of \$1,000 and \$500.

Traffic and Transportation

Missouri Commission Enjoined

Federal Court Holds Joplin & Pittsburg Rate Confiscatory and Suggests One of 2.5 Cents a Mile

Federal Judges Stone, Van Valkenburgh and Wade, sitting at Kansas City, Mo., on Nov. 11 issued an injunction restraining the Public Service Commission of Missouri from enforcing a passenger rate of 2.12 cents a mile on the Missouri lines of the Joplin & Pittsburg Railway, Pittsburg, Kan. The company has been authorized to collect 2.5 cents a mile on condition that coupon slips be issued to passengers. The difference between that rate and the 2.12-cent rate will be impounded pending submission to the higher courts.

COMMISSION MAY BE ENJOINED

The court's order establishes the principle that a State commission may be enjoined from enforcing increased rates because the increase granted is inadequate. The court held that the 2.12-cent rate was confiscatory. While it is stated specifically that it had no power to fix a rate, the court said it could indicate a maximum rate, by which the company might be guided pending the fixing of a remunerative rate by the State commission. The court set the minimum remunerative rate at 2.5 cents a mile.

The Joplin & Pittsburg Railway operates 104 miles of interurban electric lines in Kansas and Missouri. In May, 1919, the Public Utilities Commission of Kansas established a rate of 2.5 cents per mile, an increase of 0.5 cent above the former Kansas rate. About the same time the Interstate Commerce Commission allowed an interstate rate of 2.6 cents. The company applied to the Missouri commission for relief on its Missouri lines and was granted a rate of 2.12 cents, as compared with the previous rate of 1.93 cents.

The company, contending that this increase was insufficient, then applied for the 2.5-cent rate. The application was denied. The company then turned to the Federal Court, and sought an injunction against the enforcement of the commission's order on the ground that the 2.12-cent rate was confiscatory, in that it failed to provide adequate revenue.

COURT UPHOLDS COMPANY

The court upheld the company's contention that the rate was confiscatory. In the ordinary course of events the issuance of the injunction would have re-established the former rate of 1.93 cents. But, since the court held that the 2.12-cent rate was confiscatory, it followed that the 1.93-cent rate fell under the injunction, being declared confiscatory also. This opened the way for the installation of the 2.5-cent rate at the direction of the court.

The court took the position that rates cannot fairly be established on the basis of pre-war costs, since present costs are not definitely known to be only temporary. In making its order the Missouri Commission had used a five-year average of costs before the war. While the court's findings with reference to the basis on which costs should be figured in arriving at equitable rates, are worded in such a way as to avoid criticism of the methods

of state commissions, it intimates that the display of figures based on costs of several years ago, does not reflect present costs. On this the court said:

It would manifestly be out of place here to disapprove the methods and standards adopted by the commission and its experts, but it may be pointed out that it appears upon the face of the report that great, if not undue, emphasis was laid upon the original cost of the property thus somewhat arbitrarily assigned to intrastate passenger traffic at a period greatly antedating that with which this investigation must deal; nor can we say that the present period of high prices is so temporary or abnormal that it may, practically, be disregarded in arriving at the value of complainant's properties. No one can say what degree of depression may ultimately come, but it is reasonably certain that the cost of the properties now under consideration will never again approximate figures prevailing in the years before the world war.

The company has installed the rate indicated by the court as the minimum under which it can operate remuneratively and is proceeding to take up with the State Public Service Commission the question of adjustment of its findings.

Jersey Abolishes Zone Plan

Modified Zone System Had Been in Effect Only Since Nov. 15—Under It Company Faced Bankruptcy

The State Board of Public Utility Commissioners of New Jersey on Nov. 29 announced that it would permit the Public Service Railway to abandon the present zone system of collecting fares and restore the old 7-cent flat rate, with one cent for a transfer. The change will become effective on Dec. 7. The board will file its report on Dec. 2. Commissioner Wright of the board dissented from the opinion.

The company asked the change on the ground that if the present system of 5 cents for the first zone and 1 cent for each additional zone was continued, the company would be forced into bankruptcy. Two previous applications for the abolishing of the zone fare system were refused by the Utility Board.

The announcement of Nov. 29 was made following a hearing on the company's application for the abolition of the system, before the Public Utility Commission. President Thomas N. McCarter of the railway company, declared at the hearing that the employees had given perfect cooperation, but that the public had failed.

Mr. McCarter explained why, when the 7-cent fare was in force, he had told the commission that the company would go into bankruptcy unless it was changed while he now declared that the company faces bankruptcy unless the flat 7-cent fare was restored, by saying that at first the results under the 7-cent fare were unsatisfactory owing to the influenza epidemic, but during the last month of the 7-cent rate the receipts increased and the company now believes the receipts would be heavier.

The so-called "five-and-one" plan of rates as proposed by the New Jersey Commission was put into effect on the lines of the Public Service Railway on Sunday Nov. 15. These rates provided that the fare for an initial ride on any car should be 5 cents, which entitled the passenger to a ride of two zones or less, with 1 cent for each additional zone. A charge of 1 cent was made for each transfer. These rates superseded those which became effective on Sept. 14.

Binghamton Increase Barred

Decision of State Supreme Court Holds New York Commission Has No Power to Grant Higher Rate

Justice Charles E. Nichols of the New York State Supreme Court has handed down an order restraining the Public Service Commission for the Second District from granting an increase in fares to the Binghamton Railway. The decision affects the company's Binghamton and Union lines. Justice Nichols has ruled that, because of provisions in the company's franchise which limit the rate of fare to 5 cents, the commission has no power to grant an increase.

CASE REVIEWED

The Binghamton Railway has been endeavoring to secure higher fares for more than a year. The City Council refused to pass an ordinance suspending for the duration of the war and two years thereafter, the franchise provision limiting the fares. Receiver Phelps then petitioned the Federal District Court for the Northern District of New York, alleging that there was no contract in existence between the company and the city of Binghamton or the town of Union, limiting the rate of fare which might be charged by the company. Attorneys for the town of Union and the city of Binghamton appeared before Judge Ray on the hearing held on this petition and objected to the jurisdiction of the court to determine this question.

The United States District Court overruled the objections and instructed the receiver to apply to the Public Service Commission for an increased rate of fare, sustaining the contention of the town of Union and the city of Binghamton, however, that the court had no power to increase the rate of fare. Upon this finding, the receiver applied to the Public Service Commission.

The city of Binghamton and the town of Union immediately appealed from the decision of the United States District Court to the Circuit Court of Appeals for the Second Circuit. The Circuit Court of Appeals sustained the contention of the city and the town that the District Court had no authority to fix the rate of fare and furthermore that the United States District Court could not decide that there was no contract limiting the rate of fare and that such a decision was beyond its power.

RECEIVER APPEALS TO COMMISSION

Attorneys for the receiver, then made application to the Public Service Commission to increase the fare, asking it to decide whether or not there was a contract between the company and the city of Binghamton and the town of Union which limited the rate of fare, which question the Circuit Court of Appeals had held could not be decided by the United States District Court. Last August, the attorney for the town of Union, and John Marcy, corporation counsel for the city of Binghamton, then made application to the Supreme Court, Albany County, presided over by Justice Nichols, for a writ of prohibition, preventing the Public Service Commission from proceeding with the hearing, basing their application on the contention that the Public Service Commission had no power to increase the rate which was fixed by contract. This decision has been fully sustained by the decision of Justice Nichols, just handed down.

Chicago Rate Reduced

Surface Lines Ordered to Sell Ten Tickets at Six-and-One-Half Cent Rate—Seven-Cent Cash Fares Stand

The Public Utilities Commission of Illinois in a decision rendered on Nov. 25 ordered the Chicago Surface Lines to sell ten tickets for 65 cents and 50-ticket books for \$3. The ticket-rates as established by the commission are 6.5 cents and 6 cents respectively. The commission refused to order the discontinuance of the 7-cent cash fare.

REDUCTIONS WENT INTO EFFECT DEC. 1

The reduced fares became effective on Dec. 1 and will continue until May 1, 1920. The commission retains jurisdiction in the case, however, and reserves the right to make such changes as circumstances may warrant. Meanwhile the hearings on valuation were continued, and it was expected that the evidence on which a permanent rate is to be based would not be complete for more than a month.

The city authorities maintained their hostile attitude after the findings of the commission had been announced. They said the fight would not end until the 5-cent fare had been restored. They hope to achieve this result through injunction proceedings which have been pending in the courts for several weeks.

In addition to establishing the new fare schedule, the commission in its findings declared that present facilities of the surface companies are inadequate, and it directed them to purchase 200 additional cars of the type in use and to have these in operation if possible within five months. One hundred additional cars are to be purchased and added to the equipment annually. The commission also announced its intention to make further orders affecting service within a few weeks.

The commission declared that the surface lines are entitled to earn operating expenses, depreciation and a reasonable return on the investment. While the valuation proceedings are still pending, the commissioners hold that it is not reasonably possible to place upon the properties a valuation of less than \$123,000,000, which was the amount fixed tentatively last April when certain items of the capital account were eliminated. The companies are in their opinion entitled to earn a return of 7 per cent upon this valuation of \$123,000,000. They, therefore, find that the requirements for all these allowances are about \$46,000,000. They estimate that a 5-cent fare would yield \$37,700,000; a 6-cent fare, \$45,000,000; and a 7-cent fare, \$52,500,000.

STATEMENT OF COMMISSION'S ESTIMATES

They decided that an average rate of 6½ cents would meet the requirements. From experience in other large cities where a considerable differential was established between cash and ticket rates it was estimated that the use of tickets would range from 65 to 93 per cent, and for this reason the several rates named above were fixed as apparently equitable.

In arriving at their total of allowances for operation, renewals and return on investment, the commissioners adopted the following from various estimates quoted in the evidence:

For maintenance	\$ 3,300,000
For power	3,200,000
For conducting transportation	10,500,000
For damages, general and miscellaneous	3,200,000
For taxes	2,050,000
For renewals	3,000,000
For return on investment	8,600,000

Regarding the allowance for return on investment the decision said:

This sum of \$8,600,000, of course, is not to be taken as an allowance for return upon the fair value of those properties actually used in the public service made after full valuation. It is the amount which the companies are entitled to earn in order that it may not appear that they have been compelled to observe a confiscatory rate. In the orders which have been heretofore made, and in this order, the indication of this amount is without prejudice to the valuation proceedings. It is made upon the theory that beyond all doubt the companies are entitled to a return upon the lowest valuation that can reasonably be placed upon their properties, and that to allow them less would result in confiscation.

COMMISSION'S REASONS REVIEWED

In detailing the reasons for its decision the board said:

With a 5-cent fare these companies will earn at the rate of about \$37,700,000 a year, or more than \$8,600,000 less than they are entitled to earn, in any aspect of this case. On the basis of a 6-cent fare the companies will earn at the annual rate of \$45,000,000. On the basis of a 7-cent fare the companies will earn at the annual rate of about \$52,500,000.

It is plain, therefore, that adherence to the principles upon which the orders of April 25, 1919, and Aug. 6, 1919, were made [the first denied the companies permission to raise fares to 7 cents; the second sanctioned the increase after their employees had gone on strike and obtained pay increases of \$8,750,000 annually] leads to an allowance to these companies of a return which will be represented by an average rate of approximately 6½ cents per passenger.

In prescribing a plan which will produce this result, it is fair and equitable that consideration should be given to the regular patrons of these companies, who make daily use of transportation over the lines in connection with their regular business.

After carefully considering the evidence in the record as to the effect of ticket arrangements which have been established in various cities, we have reached the conclusion that the results above stated can be accomplished without injustice to the companies, by the establishment of a 7-cent cash fare, and by making provision for the sale of tickets, at places convenient to the regular patrons of the companies, at the rate of ten tickets for 65 cents, and for bearer ticket books of fifty tickets for \$3.

In formulating the plan consideration has been given to the fact that experience in other large cities shows that where there is a substantial differential in favor of purchasers of tickets, a very high percentage of passengers use the tickets instead of paying cash fares.

These percentages range from 65 per cent to 93 per cent, and it is doubtful whether, under the plans herein provided, the companies will receive an average fare of more than 6½ cents.

Plans to Abandon Bridge Service

The New York & Queens County Railway, Long Island City, N. Y., will cease operation of all cars across the Queensboro Bridge at midnight on Dec. 15. W. O. Wood, president of the company, has so informed Alfred M. Barrett, Deputy Public Service Commissioner. Mr. Wood states that his company is now preparing a new tariff schedule, which he will ask the commission to put into effect.

According to Mr. Wood, on June 12, 1919, he notified the Board of Estimate & Apportionment of New York City that his company would not exercise its right to renew the old contract for operation over the bridge. The terms of this contract are too onerous for present day operation, Mr. Wood declares. At the same time, he notified the Board of Estimate that his company was ready to negotiate for another agreement to operate across the structure.

The city of New York owns the tracks on the Queensboro Bridge, and the rails have only been leased from the city by the railroad. The New York & Queens County Railway has been operating for the past ten years over this structure through an agreement with the city of

New York. This agreement expires on Dec. 16.

The Public Service Commission has appealed to Borough President Connolly to take action in the Queens transit matter and consult with the other members of the Board of Estimate & Apportionment to find if possible a way out of the muddle. President Connolly will follow the suggestion and expects to have conferences with representatives of the railway and with members of the board.

Seeks Fare Increase in Portland

According to officials of the Portland Railway, Light & Power Company, Portland, Ore., the recent wage increase to its employees, referred to elsewhere in this issue, will necessitate the raising of fares in Portland. The new wage scale, it is stated by Franklin T. Griffith, president of the company, will absorb practically all of the earnings of the concern, which under the previous rate scale, are said to be less than 3 per cent of the actual value of the railway properties. The matter is now before the Public Service Commission, but final hearing will probably be deferred until the middle of December. The application filed with the commission by the company does not ask authority to increase the fares to any fixed amount, but requests the regulative body to decide what the rate shall be.

Traffic Solution Sought at Pittsburgh

An organization known as the Citizens' Committee on City Plan of Pittsburgh, formed some time ago by a group of men who head some of the largest financial and commercial concerns in Pittsburgh, Pa., has announced that it will undertake, at once, an investigation of the entire matter of traffic in that city, with a view to rearranging traffic channels and electric railway lines and extending the facilities for vehicular travel. The scheme calls for a "major street plan," which will be an effort to co-ordinate thoroughfares, railroads and railroad terminals, traction lines and their terminals, and other public utilities. One of the intentions of the committee is to make the public realize the direct connection between traction facilities and the growth of various sections of the city.

More Safety Cars for Terre Haute

On the Terre Haute division of the Terre Haute, Indianapolis & Eastern Traction Company, all lines except one have now been equipped with safety cars of which there are thirty-eight in regular operation. Eight safety cars were added on Nov. 18 and eight on Nov. 23. The Terre Haute lines have had thirty safety cars in service for some time. These have proved so satisfactory and have met with such favor from the public that there was no difficulty in installing the additional cars. No special advertising was necessary. On one line the headway has been reduced from ten minutes to eight minutes and on the other from ten minutes to seven minutes. This has been accomplished by the installation of only two additional cars on the two lines. The Terre Haute division is now operating approximately 6000 car miles daily with safety cars.

Course Outlined for Los Angeles

Railroad Commission Advises One-Man Cars, Discontinuance of Paving and Prohibition of Parking in Downtown District During Day Time

A 5-cent fare is sufficient for Los Angeles, and there is no need for a charge for transfers, says the report of the engineers of the Railroad Commission filed Nov. 12 with the city authorities of Los Angeles. Supporting this contention the commission's engineers tell how the Los Angeles Railway Corporation can save \$1,500,000 a year by better methods of operation. In this connection they recommend that one-man safety cars should be operated on most of the company's lines. The purchase of 400 of these cars at a cost of \$2,800,000 is advised. It is estimated that these cars will save \$625,000 per annum and will pay for themselves in about four years.

ROUTING RECOMMENDED

Recommending a complete rerouting scheme, abandonment of certain lines and services; special regulation devised to prevent street traffic congestion, such as parking of autos and street turnings of machines, the engineer's report urges a change in the method of management of the company and recommends "that the company use better methods in dealing with employees and with the public."

In connection with the company's treatment of employees the report recommends the establishment of a pension insurance plan, saying: "The financial condition of the company, in the economies which we believe are possible under our recommendations are effected, will permit of the institution of a pension insurance plan." The commission declares the determination of a just return for labor is just as much a matter of public concern as is the determination of just return for capital.

The report contains the further declaration that unless the recommendation of the Railroad Commission engineers are carried out it will be necessary to increase fares.

The report is a document of about 400 pages and contains the result of an exhaustive investigation carried on during the last nine months of all phases and branches of the Los Angeles Railway Corporation's operations. That portion of the investigation covering street railway service and the traffic congestion problems in the city streets was made by the Railroad Commission engineers jointly with H. Z. Osborne, Jr., chief engineer of the Board of Public Utilities of the city of Los Angeles.

FARE INCREASE NOT JUSTIFIED

The report of the commission's engineers is signed by Chief Engineer Richard Sachse. On the matter of fares the report says:

An increase in fares for the Los Angeles street railway system is not justified and not necessary under present conditions. Conditions can be created under which it will be possible with the estimate of minimum savings to reduce operating expenses by \$620,000 per annum, and simultaneously increase the depreciation allowance by \$180,000 per annum, equal to a total saving of \$800,000 a year. The showing under the maximum of estimated savings will result in a reduction of \$1,105,000 per annum with a simultaneous increase of the depreciation allowance of \$390,000 per annum, equal to a total saving of \$1,495,000 per annum. This showing is made without taking into consideration any other large savings that may be effected by economies in paving construction and maintenance and other savings that can be brought about through a modification of franchise conditions and through other possible economies. The savings estimated will enable the company to meet all of its interest requirements and sinking fund

obligations and will in each case leave a very substantial surplus.

Acceptance by the city and the railway of an "indeterminate resettlement franchise" is recommended. It is pointed out that this type of franchise should determine the condition under which the city may acquire the railway properties, the methods of determining value of property, disposition of revenues and provisions governing service and extensions.

Regarding street paving and its cost, the report says:

It is unjust and not to the best interest of the city that this total paving expense should be paid for in fare by the car riders. In the early history of street railway operation the paving clauses were inserted in the franchises in an effort to have the company share some portion of the street railway profits with the municipality. No objections could be offered to such procedure if the old conditions still existed. They no longer exist, however. The speculative element has been entirely eliminated from street railway operation in the last years and it is now no longer a question of excessive profits, but rather one of finding the necessary revenue and funds to pay the operating expenses, depreciation and a moderate return on actual value of actual investment. The fact is that the paving between the rails and outside the rails is not used or worn out through the use of the electric street railway, as was the case with the horse cars. It is worn out—and to a greater degree than paving on other streets—by the use of other traffic. It can be demonstrated that the street railway patron in many instances is not only forced to pay the cost of paving which does not contribute to his benefit, but is forced to pay for paving that contributes to his detriment. This is true because of delays to street railway traffic in all paved streets that is caused by other traffic. Under present conditions the car rider pays from 40 to 50 per cent of the cost of paving on all streets on which there are tracks, the property owners on these streets both receiving the increase in property values, due to the proximity of transportation, and bearing lesser cost of paving the streets than the owners of property on streets not occupied by car tracks.

The engineers say that the problem of the relations between the company and its employees, including matters of wages and living conditions, is in some respects the most urgent and important matter before the company. On this point they say:

When we find that during the past six years an average of 40 per cent of the entire number of platform men is changed annually, it is apparent at once that the problem of obtaining and keeping permanent and capable men requires the most serious consideration. The methods now being used by several utilities in the United States and notably in Philadelphia, in our opinion, lead in the right direction and are worthy of the most careful investigation and study by the owners and responsible officials of this property. It is possible, we believe, with methods of absolute frankness and absolute fair dealing to create a real and lasting partnership between all of the employees of this company and the owners of the property. The practical working out of a definite program should be left to the management and the employees of the company, but the commission and the city should insist upon such a program being formulated and lend every effort to carry it into effect.

In the last analysis the determination of the just compensation for the services of the employees of an essential public utility is just as much a matter of public concern as is the determination of just compensation for capital (with a fixing of a fair return), and for property (in condemnation proceedings, for instance). Rates, as a matter of cost, must be so adjusted so as to enable the utility to pay this just compensation. And if the entire transaction and the entire determination of the question is carried on with broad publicity, and if the people of the community are, at all stages, kept reliably informed of what is being done, there is no doubt that the overwhelming majority of the community would be in fullest accord with such a procedure and would be ready to pay this first cost of the desired service.

One of the most important recommendations, in the report, is the prohibition of the parking of automobiles in the most congested part of the downtown district between the hours of 8 a. m. and 6 p. m., except on Sundays and legal holidays. Other traffic recommendations prohibit all left-hand turning of automobiles in this

district at all times. These two recommendations, in the opinion of the commission's engineers, will relieve the great traffic congestion in the business district and will make it unnecessary to issue traffic regulations to force street car riding in one direction only, as has been urged by a number of people.

The report goes into the details of the company's organization and management and the engineers believe that great economies and improvements are possible and should be adopted. It is declared that the present operations of the company have outgrown the system or organization and that a modern one should be adopted with centralized authority definitely placed.

Missouri Commission Upheld

United States Supreme Court Upholds Fixing of Rates Regardless of Franchise Provisions

The United States Supreme Court in a ruling handed down on Nov. 10 dismissed the appeal of the city of Kansas City, Mo., from a decision of the Supreme Court of the State upholding the right of the State Public Service Commission to raise the fare in Kansas City. The court's action means, in effect, that the Missouri Public Service Commission has authority to fix rates regardless of franchise provisions limiting fares to 5 cents.

The franchise of the Kansas City Railways limits the fare to be charged by the company to 5 cents. In February, 1918, the company filed a petition with the State Public Service Commission, requesting the commission to inquire into the question of rates to be charged by the company, and to make an order fixing such reasonable increase in rates as the facts warranted. The city of Kansas City filed an answer objecting to the jurisdiction of the commission, upon various grounds, and among the defenses set up the claim that the franchise ordinance passed in July, 1914, constituted a contract between the city and the company.

COMMISSION FIXED FARES

The commission overruled as to its jurisdiction, and after hearing the evidence, made an order fixing the rate of fare to be charged by the company at 6 cents for passengers more than 12 years old. The city then brought the case up for review before the Circuit Court of Cole County, Mo., and the order of the commission was reversed and set aside. The Kansas City Railways and the Public Service Commission of Missouri then appealed to the Supreme Court of Missouri. The Supreme Court reversed the judgment and order of the Circuit Court and affirmed the judgment of the Public Service Commission.

The city thereupon brought the case to the Supreme Court of the United States upon writ of error. Upon application of the company the Supreme Court dismissed the case, in effect upholding the decision of the Supreme Court of Missouri and ruling that the commission had jurisdiction in spite of the franchise.

Meanwhile the commission, acting on the plea of the company that a 6-cent fare was insufficient, in August of this year authorized the installation of 8-cent fares on the Kansas City lines. The commission ordered that the higher rate should become effective on Sept. 1. The company delayed putting the 8-cent rate in effect until it had secured a sufficient number of tokens, which, the commission ordered, should be sold at 7 cents each.

104,430,015 More Passengers

This Is Record of New York's Transit Lines for Year Despite 17,000,000 Passenger Loss During Epidemic

The Public Service Commission for the First District of New York on Nov. 24 made public its annual summary of passengers carried for the year ended June 30, 1919, on the transit lines of the greater city. The growth in traffic in the year recently closed was almost unprecedented in spite of the ravages of the influenza epidemic during the autumn months of 1918.

INCREASE FOR SEVEN MONTHS 122,500,000

This epidemic caused a falling off in October alone of more than 12,000,000 fares and for the period of July to November, inclusive, of 1918 of 17,000,000 fares. Based on the number of fares collected the figures show that during the year 2,079,942,604 passengers rode on the lines, an increase of 104,430,015 over 1918.

In December the conditions changed for the better, normal conditions for the year were resumed, and the number of fares increased 8,500,000 during the month. Each month after December showed increasing traffic, as follows:

December	8,500,000
January	15,700,000
February	13,200,000
March	15,800,000
April	20,000,000
May	23,100,000
June	25,600,000

Total 122,500,000

The report shows that the total increase of approximately 104,500,000 was divided between the various lines as follows: Rapid transit lines, 98,751,618; surface lines, 5,679,197. On the basis of percentages the total increase was 5.29 per cent, all of which went to the rapid transit lines except 0.65 per cent which went to the surface lines.

Details contained in the report disclose the fact that the largest percentage of gain was by the elevated lines of the Brooklyn Rapid Transit System, where the growth was nearly 20 per cent, which represented a total traffic of 308,879,791, or an increase of 50,712,478 over that of 1918. The heaviest traffic on any single system was on the subway lines of the Interborough Rapid Transit Company, where the grand total of passengers was 461,147,058, which represented a gain of 10.23 per cent, of 42,889,050 more than were carried in 1918.

There was a decrease of 1.27 per cent on the Interborough elevated lines, representing a loss of 4,472,059. These elevated lines carried a total of 348,188,600 passengers during the year. Figures of the business done by the Hudson & Manhattan Company disclosed a gain for the year of 12.70 per cent, or an increase of 9,701,817 passengers in a total of 36,050,815.

RECORD FOR THREE YEARS

Figures on traffic on the surface lines, divided among the boroughs, show that in Manhattan the total traffic was 370,085,099 passengers; a loss of 1,051,290, or 0.28 per cent less than in 1918; in Bronx there was a gain of 1.11 per cent in a total of 80,806,261; in Brooklyn there was a gain of about one-half of 1 per cent in a total of 362,103,192; in Queens the gain was 7.54 in a total of 3,275,369, while in Richmond the gain was 4.38 per cent and the total was 15,958,213.

A comparison of traffic for the last three fiscal years follows:

ELEVATED AND SUBWAY

	1918	1919
Interborough Subway ..	418,337,666	461,147,058
Interborough Elevated ..	352,600,669	348,188,609
B. R. T. Elevated and Subway ..	258,167,313	308,879,791
Hudson & Manhattan Tubes	76,548,998	86,050,813
Total	1,105,514,046	1,204,266,264

STREET SURFACE LINES

Manhattan	371,136,389	370,085,099
Brooklyn	360,207,655	362,103,192
The Bronx	79,917,071	80,806,261
Queens (B. R. T.)	43,448,206	46,723,575
Richmond	15,287,922	15,958,213
Total by boroughs ..	869,997,143	875,676,340

Grand total all lines 1,975,511,789 2,079,942,604

The report says that the traffic problem in the city is exemplified by the fact that since 1903, a period of sixteen years, the traffic on all of the transportation lines has more than doubled, and that the billion mark was first passed in 1903. To illustrate the point the following table is submitted:

Year Ended June 30	Number of Passengers	Annual Increase
1903	1,090,767,483	01,717,519
1904	1,065,984,910	65,217,427
1905	1,130,982,000	64,997,486
1906	1,251,841,173	120,858,470
1907	1,315,381,388	63,540,213
1908	1,358,000,407	42,619,049
1909	1,402,417,642	44,417,235
1910	1,531,262,014	128,845,272
1911	1,603,001,397	72,638,483
1912	1,680,913,935	70,012,530
1913	1,709,876,508	88,962,573
1914	1,813,204,356	43,327,840
1915	1,807,632,726	95,571,630
1916	1,898,735,615	91,102,889
1917	1,918,812,220	20,076,611
1918	1,975,482,316	56,640,087
1919	2,079,942,604	104,430,815

5,700,000 RIDE DAILY

It appears from the figures that the average traffic each day during the last fiscal year was 5,700,000, which about equals the population of the city. Toward the end of the year the daily averages of rides increased to 6,400,000. The fares per capita collected in 1860 were 43, and in 1919 the number had increased to 370 which shows, according to a comment in the report, that the habit of riding is growing steadily more popular. Then the report says:

The increase of 104,430,815 passengers brought approximately \$5,220,000 additional revenue to the railroad companies, which with revenue other than that gained by operation of the lines, yielded a total revenue for the year of \$110,191,032, or \$0.690,919 more than in 1918. Operating expenses increased greatly, however, the total of these increases being \$15,267,181, which caused a deficit in net income of \$8,085,819.

The average cost of transporting each passenger (no allowance being made for taxes, interest, or dividends) was 3.446 cents in 1919, as against 2.298 cents in 1918, and 2.638 cents in 1916.

It is pointed out that because of the opening of the new subway lines the total increase in the length of track was 64 miles, and the number of passenger cars in service grew from 12,775 to 13,035.

Wants Columbus Service Improved

The City Council of Columbus, Ohio, has passed a resolution calling upon the Columbus Railway & Light Company to furnish service more nearly adequate to the traffic requirements of the city. C. L. Kurts, president of the company, in a letter addressed to Milton W. Westlake, the president of the Council, stated on Nov. 17 that the company could not improve the service at the present rate of fare. Mr. Kurts declared that the company had been forced to curtail the service to meet the wage increases and back pay awarded to the employees last year.

Views on Fare Question

Chicago "Daily News" Prints Series of Articles—Railway Operators Among the Contributors

Under the title of "How can Chicago get back the 5-cent fare?" the Chicago *Daily News* has been printing a series of articles on the fare question for several weeks past. The discussion was started with an interview with Thomas E. Mitten, president of the Philadelphia Rapid Transit Company, amplifying the statements he had previously issued concerning the 5-cent fare in Philadelphia. Another of the series contained the statement of L. A. Busby, president of the Chicago Surface Lines, which was printed in the issue of the *ELECTRIC RAILWAY JOURNAL* for Oct. 25, 1919.

AN ALDERMAN SUGGESTS RELIEF

Another view of the fare situation in Chicago was given by Alderman Henry L. Capitain of the Chicago Local Transportation Committee. In brief Alderman Capitain's opinion was that Chicago could get back its 5-cent fare only by assuming burdens it now lays upon the company. Upholding this view, he said:

One method for securing a 5-cent fare would be for the city to make up arbitrarily any deficit from some other sources than car fares. The only other source that occurs to my mind would be general taxation. How much do the 5-cent fare advocates think the general public would relish seeing their taxes spent to make good deficits yawning between the receipts and expenses of running the street cars because the nickel isn't big enough to pay all the cost? The most practical plan would be to combine all our local transportation facilities and add to these combined systems whatever subways may appear necessary. The combination of the "L" underground and surface lines would do away with competition and enable large savings to be achieved in the cost of operation.

Mayor Thompson furnished one of the series of articles, devoting the space to a condemnation of the present management, an appeal for retention of the present fare ordinance and an explanation of his plan for municipal ownership for the city of Chicago which has previously been described.

THREE ARTICLES ON DETROIT

The Detroit situation was covered in three separate articles, one being an interview with Mayor Couzens, another with President Brooks of the Detroit United Railway, and another a review of present conditions in that city. Mayor Couzens referred to the deficiencies of the service on the lines of the Detroit United Railway in Detroit and insisted the only remedy lay in municipal ownership. He said:

I am viciously opposed to any higher street car fare than 5 cents. I do not intend to be radical or to violate property rights. But neither do I propose, if it is humanly possible to prevent it, that a public utility which has taken away millions from the people of this city during fat years shall now come back on the public to make good at the first sign of increased costs or the possibility of losing money.

DETROIT PRESIDENT SAYS LIMIT HAS BEEN REACHED

President Brooks of the Detroit company was quoted as saying:

It is utterly impossible to give up-to-date street car service for a nickel. In Detroit we are not getting by with a 5-cent fare by a whole lot. We can't go ahead much longer without reaching some settlement. By insisting upon a nickel as the maximum street car fare the people of the city of Detroit will soon find out that they have eaten their cake and the bake-shop is closed.

Mr. Brooks admitted that it was impossible to maintain the properties in good condition. He said that the average dividend of the Detroit United Railway since 1901 has been less than 4 per cent. The company there operates 538 miles of line, with more than 1800 cars.

Relief for San Diego

California Commission Orders Two-Zone System With Five-Cent Fare in Each Zone—One-Man Cars Urged

The Railroad Commission of California on Nov. 14 issued an order authorizing the San Diego Electric Railway to adopt a zone system under which the city of San Diego is to be divided into two zones, an outer and an inner, with a 5-cent fare in each. The commission stated in the order that the adoption of a zone system afforded the only solution of the electric railway problem in San Diego.

CITY AND SUBURBAN FARES READJUSTED

The zone system provides that the fare, including transfers between any points within each zone is to be 5 cents and the single rate, through two zones, 10 cents. Ticket books, four tickets to a book, good in both zones, at 7½ cents a ride are provided for, also monthly sixty-ride ticket books, good in both zones, at 6½ cents per ride. All other fares in outlying territory, including the cities of Coronado, National City, Chula Vista, East San Diego and Point Loma are readjusted.

The inner zone has a radius of approximately 1 mile, measured from the intersection of B Street and Broadway. The outer zone extends from the end of the inner zone to the ends of the various car lines and to the limits of National City.

The commission, in ordering the adoption of this plan, for the first time in its existence abandoned the one-fare principle in fixing the fare within the limits of a municipality. Commissioner Devlin, who wrote the order, stated that although he was of the opinion that the zone system could not be adopted indiscriminately, he considered the arguments of the commission's engineers in support of its adoption in San Diego, to be sound.

The commission recommend strongly that one-man cars be put in operation in San Diego. The commission refused to authorize the company to discontinue a number of lines in San Diego, in East San Diego and in Point Loma, holding that the proposed system of operation will produce sufficient revenue to justify their continuance. The commission did, however, authorize abandonment of service on the Fifth Street car line in Coronado and orders changes on certain lines in San Diego.

The city of San Diego is urged by the commission to change its paving requirements and to relieve the car riders from the burden of having to pay for some of the most expensive paving in the city. Appointment of a paving committee consisting of the engineers of the city and the company, who shall meet at certain times and decide what paving expenditures shall be incurred, is recommended by the commission, the decision to be made by the commission in the event of failure to agree.

DEPRECIATION FUND \$18,000 A MONTH

The commission also ordered the company to set aside a depreciation fund of \$18,000 a month.

The commission estimates that under the proposed zone system of fares there will be a decrease in passengers in the next year of 335,000 (about 2 per cent) and that there will be a decrease in earnings of about \$10,000. The commission is of the opinion, however, that with conditions changed to meet the requirements of its order and proposed plan of operation, there will be a profit of \$110,000 as

against a loss of approximately \$23,316 probable under the present method.

The company's case has been before the commission for many months. The company stated in 1918 that it was losing money, but refused to ask for a definite increase in fares until its condition had been thoroughly investigated by the commission. Richard Sachse, chief engineer of the commission, after a thorough investigation of the company's fares reported that the company was in need of more revenue and urged the adoption of the two-zone system.

In the valuation of the properties of the San Diego Electric Railway, the commission gives a figure of \$4,726,693 as the reproduction cost less depreciation. The books of the company claimed \$5,068,119 as the investment. Commissioner Devlin declares, in giving consideration to both figures, that it is impossible to base rates for this company on the value of the plant. He said:

It does not seem to me that establishment of rate base is practical interest in this proceeding. I make this statement because it is evident to me that a fair return on a proper rate base figure is not here a controlling factor. It will become clear that conditions in San Diego and in the territory served by this street railway system are such that rates which theoretically and on paper might produce a fair return on a fair rate base cannot, as a practical matter be put into effect. If the fare exceeds a certain maximum, traffic will automatically decline to such an extent that the cure will be worse than the disease, and the result would be, in my opinion, the end of this transportation system.

Tokens Popular in St. Louis

The United Railways of St. Louis on Nov. 1 last put into effect an 8-cent cash fare, with two tokens for 15 cents, seven tokens for 50 cents, and fifty tokens or tickets for \$3.50. The tokens sold at the rate of two for 15 cents are of bronze, and slightly larger than a cent. These are sold by the conductors only. The tokens sold at the rate of seven for 50 cents and fifty for \$3.50 are slightly smaller than a dime and are sold only by agencies.

On the day when these fares became effective, the cash fares equalled 27.91 per cent of the total, while that of all classes of tokens combined equalled 72.09 per cent. On Nov. 15 cash fares had been reduced to 6 per cent with all classes of tokens combined equaling 94 per cent. It is believed that cash fares will be further reduced to at least 5 per cent, as the decrease has been steady since Nov. 1.

Tokens and tickets are at present sold by about 800 agents throughout the city. The principal agencies sellers are the department stores and banks, one store selling as much as \$1,400 of tokens a day. No compensation is given the agents for selling the tokens with the exception that they sometimes break the packages of tokens sold fifty for \$3.50 and sell them in small lots of seven for 50 cents. This is done more for the convenience of patrons of the stores than for any profit which is received.

The company has 4,080,000 tokens in circulation and could use many more if they could be obtained. To fill the demand, emergency paper tickets have been issued in books of fifty which are sold for \$3.50 each. As Johnson fare boxes are used on the cars, these tickets together with children's tickets are at present being rung up on an overhead register. Enough tokens of the seven-for-50-cents and fifty-for-\$3.50 variety have been ordered to bring the total of tokens up to 6,000,000, and it is believed that it may be necessary further to increase the order so as to place 10,000,000 tokens in circulation.

Safety Cars Considered

Atlanta Company Alive to Their Advantages, But Must Meet Local Traffic Requirements

Safety cars have not as yet been used in The Gate City of the South, but this does not mean that the management of the Georgia Railway & Power Company, Atlanta, is not keenly alert to the possibilities they offer. Two things have deterred the purchase of cars of the safety type. The first is that all lines in Atlanta pass through the downtown section and the riding is very heavy on all of them.

There are no cross-town lines, or lines having light traffic or well distributed loading, where an initial installation of safety cars might be made under conditions which would give the public and operators a fair chance to become accustomed to the radical change. In other words, the initial installation must of necessity be tried out under the severe conditions encountered in passing through the very congested downtown streets. This fact has caused the officials of the company to proceed cautiously until fully convinced that all other factors entering into the operation of these cars could be properly met.

The second and more complex consideration which has delayed the use of the light-weight cars is the negro problem. Georgia is reputed to have more negroes than any other State, in proportion to the total population, and Atlanta has an abundant share of them. Forty to 45 per cent of the population is black.

The problem has been found so serious that the use of pay-as-you-enter cars is a source of much trouble, and the intermingling of the two races in entering and leaving these cars is less than it is with the safety car.

Hence the officials have about reached the conclusion that if they do try out the one-man cars, the first cars at least will have to be built with doors at both sides of both platforms so that the cars will be suitable for two-man operation if they prove incapable of coping with the two races.

Opposed to Extension of Parking Time

A special committee of the retail merchants' bureau of the Merchants & Manufacturers' Association, Baltimore, Md., proposes to ask the City Council for an extension of the time allowed for parking automobiles in the afternoon from 4.30 to 5.30 o'clock.

In answer to the argument of the merchants' bureau that customers who come in automobiles to shop at 3.30 p. m. generally need at least two hours in which to make all their purchases properly, C. D. Emmons, president of the United Railways & Electric Company, states that they could as easily commence at an earlier hour. He says that the thousands of people who are finishing a day's work at that hour and are anxious to get home to the evening meal are the ones who have the right of way.

The company made complaint on Nov. 25 that the parking law was not being enforced as it should be, to which Marshal Carter replied that, while there may be some lack of vigilance on the part of the police, the ordinance is being generally enforced.

When the City Council committee on police and jails hears the merchants' proposition officials of the railway will oppose the proposed amendment.

Extra Fare Charge Abandoned

Brooklyn Hoodlums Make It Desirable for Company to Suspend Extra Fare Pending Court Ruling

The Brooklyn (N. Y.) City Railroad, formerly included in the system of the Brooklyn Rapid Transit Company, decided on Nov. 25 to collect only a single fare on its Flatbush Avenue line until the Supreme Court has passed upon the right of the company to collect two fares. The extra fare change was put into effect following the segregation of the old Brooklyn City lines from those of the rest of the Brooklyn Rapid Transit System following the default by the latter in the payment of rental charges. The second-fare point as at first established was recently moved farther out from the city, but a great deal of trouble attended the collection of the second fare.

COMPANY AND COMMISSION CLASH

The two fare scheme was abandoned just before the heavy traffic of evening set in and after a conference between Col. William N. Dykman, counsel for the road, and District Attorney Lewis. It came after two days of disorder on cars and constant fighting between passengers and the company's inspectors at Foster and Flatbush Avenues, the point where the two fare rule was being enforced.

The company in trying to collect two fares ignored an order of the Public Service Commission and obtained an order of certiorari requiring a review of the Public Service Commission's order by the Supreme Court. District Attorney Lewis appealed to by Flatbush residents promised he would begin prosecutions against officials of the road.

He discovered, however, that the Public Service Commission had not made personal service of its order on the railroad directors and took the view that he could do nothing until proper service was made. At noon on Nov. 25 the Public Service Commission made personal service on eight of the directors and Mr. Lewis at once called up Colonel Dykman and informed him that he would institute proceedings immediately if the order was not obeyed.

Colonel Dykman asked him to wait long enough for the directors to hold a meeting. The meeting was called within a couple of hours and at its adjournment orders were issued to employees of the Flatbush Avenue line directing them to carry passengers for a single fare.

It is said that about fifty passengers were forcibly ejected from cars during the day and that seventeen inspectors were arrested on charges of assault preferred by passengers.

The company was seeking a speedy ruling from the court on the points at law involved in the controversy and was prepared to issue rebate slips to protesting passengers.

Chicago's October Earnings

Figures on earnings, expenses and traffic of the Chicago (Ill.) Surface Lines for the month of October as filed with the commission by the railway companies show the following comparisons:

	Oct. 1919	Oct. 1918	Oct. 1917
Revenue			
passengers ..	64,022,273	55,548,262	60,367,237
Transfer			
passengers ..	46,562,648	40,267,932	43,765,971
Free passengers	2,767,809	2,245,543	2,546,705
Total			
passengers ..	113,352,790	98,061,737	106,679,913
Gross earnings.	\$4,519,329	\$2,821,389	\$3,067,492
Total expenses.	3,440,036	2,341,882	2,020,170

Attorney General Brundage also filed with the commission an analysis of these figures. It was expected the commissioners would use his conclusions as a guide in fixing the new fare schedules. It was pointed out that the loss of traffic due to the influenza epidemic in 1918 should be considered in connection with the present favorable showing.

Transportation News Notes

Whitman Jitneys Under Ban.—The voters of the town of Whitman, Mass., have passed an ordinance imposing a fine of \$20 upon the operation of a jitney bus within the town limits. A petition for the licensing of jitneys in Whitman has been rejected.

Seven Cents on Fitchburg Line.—The Fitchburg & Leominster Street Railway, Fitchburg, Mass., has been authorized by the State Public Service Commission to increase its fare from 7 cents to 10 cents and to advance its rate on strip tickets from 6¼ cents to 8½ cents.

Six Cents in Trinidad.—The Trinidad Electric Transmission, Railway & Gas Company, Trinidad, Col., has installed 6-cent fares on its lines under authority recently granted by the Public Utilities Commission of Colorado. Children's fares now cost 3 cents.

Jitneys Barred in Brockton.—The Board of Aldermen of Brockton, Mass., voted on Nov. 17 to revoke all jitney licenses within the city. The order was scheduled to take effect on Nov. 22 at midnight. Seven jitney lines and several bus routes are affected by the action of the board.

Seven Cents in Burlington.—Under authority of the State Public Service Commission, 7-cent fares went into effect on the lines of the Burlington (Vt.) Traction Company on Nov. 12. The company has applied to the commission for an increase in interurban fares between Essex Junction and Winooski.

Six Cents in Pueblo.—A straight 6-cent fare became effective on the lines of the Arkansas Valley Railway, Light & Power Company, Pueblo, Col., on Nov. 11. The higher fare was installed following an agreement between company officials and the Pueblo city authorities. The company had previously applied to the State Public Utilities Commission for authority to charge 7-cent fares in Pueblo.

Seven Cents in McAlester.—The Pittsburgh County Railway, which operates the electric railway at McAlester, Okla., has been authorized by the Oklahoma Corporation Commission to charge a 7-cent fare with a 5-cent rate for children. The company has filed a protest with the commission against the zone system established on its interurban lines.

Eight Cents in Morgantown.—The South Morgantown Traction Company, Morgantown, W. Va., has received permission from the State Public Service Commission to raise its fare from 5 cents to 8 cents. The company, which is now in the hands of a receiver, had applied

for the increase after it had been forced to discontinue service owing to lack of funds.

Higher Rates Asked on Interstate Line.—The Ohio Valley Electric Railway, Huntington, W. Va., has filed with the Interstate Commerce Commission an application for an additional 5-cent zone on its line between Huntington and Ashland, Ky. Under the proposed schedule the fare between the two cities would be raised to 25 cents.

Would Penalize Cash Fares.—The Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., has petitioned the Public Service Commission of Indiana for authority to collect a 5-cent penalty when a passenger pays a cash fare of 50 cents or less on board a train or one of 10 cents when the fare is more than 50 cents. The company proposes to refund the penalty at the nearest ticket office.

Traffic Districts for Dallas.—Owing to the constantly increasing volume of traffic on its lines, the Dallas (Tex.) Railway has divided its system into five operating districts, each district embracing a portion of the city of Dallas. Each district will be in charge of a supervisor of traffic, to whom a staff of inspectors will report. The five district supervisors will be under the immediate direction of C. A. Swanson, superintendent of transportation of the company.

Eight Cents Cash in Nashua.—On Nov. 1, 1919, the Nashua (N. H.) Street Railway increased the cash fare from 7 to 8 cents. Checka good for one fare are sold in quantities for 7 cents. In connection with this change the road has put into service the one-man type of car for the outlying districts. A new policy has been devised wherein the power will be obtained from the Manchester (N. H.) Traction Company instead of from the Lowell Power Company, as for many years.

Inter-company Transfers Abolished.—The Washington Railway & Electric Company, Washington, D. C., has discontinued the sale of 2-cent inter-company transfers on its suburban lines. The company formerly issued transfers on commutation tickets which entitled the holder to a ride on the lines of the Capital Traction Company in the city of Washington. Commuters from Maryland will now be required to pay an additional fare of 7 cents if they transfer onto the lines of the latter company.

Must Resume Service at Ballston.—The Public Service Commission for the Second District has directed the Kayderose Railroad Corporation, Ballston, N. Y., to restore service by operating a combined passenger and baggage car for two round trips daily. The company announced on Oct. 2 that, because of the shutting down of paper mills along its route as the result of a strike, its revenue had declined to \$800 a month, while its operating expenses amounted to \$2,500 a month. The cutting off of the service followed.

Interstate Fares Raised.—The Rhode Island Company, Providence, R. I., has received permission from the Interstate Commerce Commission to establish on its interstate lines the 6-cent zone fare granted some time ago by the State Public Utilities Commission on the company's Rhode Island lines. The order affects passengers on the Danielson and Taunton lines, which enter Connecticut and Massachusetts respectively. The company has been collecting 6 cents for each zone travelled on these lines and issuing refund slips.

Personal Mention

Mr. Pierce Joins Ivy L. Lee

**Will Engage in General Publicity Work
After Many Years of Newspaper
and Corporation Experience**

Daniel T. Pierce, who was executive assistant to the president, Philadelphia (Pa.) Rapid Transit Company, from 1906 to 1909, and has been a frequent contributor to this paper, has joined the organization of Ivy L. Lee. Mr. Pierce was graduated from the Columbian University Law School in 1894, and then became editor of *Public Opinion*. After a period of seven years with this paper, he became correspondent of various western papers, and in 1904 became associated with Mr. Lee.

In 1906, at the request of Charles O. Kruger, then president of the Philadelphia Rapid Transit Company, Mr. Pierce joined the forces of that company as assistant to the president and was associated with the company during the strikes of that period. He left the Philadelphia Rapid Transit Company in 1909 to join the McGraw Publishing Company, devoting his time to editorial work on the *Engineering Record*, *Electrical World*, and *ELECTRIC RAILWAY JOURNAL*.

In 1910 he returned to Philadelphia to become executive assistant with the General Asphalt Company, and remained with that concern until the outbreak of the war. He then acted for a short time as director of the information department of the American International Shipbuilding Corporation, but at the request of the Red Cross officials went to Paris to manage their publicity in Europe, as director of the department of public information of the American Red Cross. He remained in Paris during all of the latter part of the war, returning to this country last spring. Some of his observations on the effect of the war on French tramways were given in an article written by him which appeared in the issue of this paper for June 7, 1919.

Colonel Dillon Joins M. I. T. Staff

Col. T. H. Dillon, Engineer Corps, U. S. A., has resigned to accept an appointment as professor of electrical engineering at the Massachusetts Institute of Technology, Boston, Mass., where he will specialize in the problems of electric railways, steam railroad electrification and power transmission. Colonel Dillon is a graduate of West Point, class of 1904, and of the Engineer School of Application, United States Army, class of 1907. His pre-war experience embraced a varied career in engineering work in Cuba, the Philippines, the Pacific Northwest and the Panama Canal Zone. He was electrical engineer of the Panama Canal and superintendent of the Gatun Locks.

In 1918 he went to France as colonel of the 37th Engineers, a noted electrical and mechanical regiment, and in France served as Deputy Chief Engineer of the First Army of the A. E. F. during the St. Mihiel, the Aisne-Marne and Argonne-Meuse campaigns, in charge of electrical and mechanical work, water supply, army shops and engineers' supplies. At the conclusion of hostilities he was made

deputy to General McKinstry, who was chief of the board of damages in Allied countries and had charge of estimates for the American Peace Commissioners of personal and property damages due to enemy aggression.

New Post for Mr. Rolston

**Former Superintendent of Indiana Interurban Appointed Superintendent
of Power at Kansas City**

William E. Rolston, formerly superintendent of power and equipment of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., was appointed on Nov. 12 superintendent of power of the Kansas City (Mo.) Railways. T. W. Hogue will continue to act as power engi-



WILLIAM E. ROLSTON

neer of the company until Jan. 1, 1920, serving in a consulting capacity. No change will be made in the power plant organization, members of which will report to Mr. Rolston.

Mr. Rolston was graduated from the Armour Institute of Technology in 1898. Three years later he joined the Dayton & Troy Electric Railway. During his connection with the company, which lasted five years, he served first as chief engineer of power plants and later as superintendent. In 1906 he became superintendent of power and shops of the Canton-Akron Railway, Akron, Ohio, now included in the system of the Northern Ohio Traction & Light Company.

In the following year he was appointed superintendent of power and shops of the Cleveland, Southwestern & Columbus Railway, continuing to act in this capacity until 1911, when he became general superintendent of the Des Moines (Ia.) City Railway. Later in the same year he was named superintendent of the Interurban Railway, Des Moines, in addition to his connection with the Des Moines City Railway. In 1912 he resigned from these companies to accept the position of superintendent of power and equipment of the Chicago, Lake Shore & South Bend Railway, continuing in this capacity until his appointment at Kansas City.

J. F. Winn has been appointed auditor of the Ottumwa Railway & Light Company, Ottumwa, Iowa, succeeding J. F. Canfield, whose appointment to be auditor of the Union Heat, Light & Power Company has been announced previously in this paper.

E. C. Macken has succeeded C. C. Moyer as train master of the Columbus, Delaware & Marion Electric Company, Columbus, Ohio. Mr. Moyer's appointment as superintendent of the company is noted elsewhere in this issue of the *ELECTRIC RAILWAY JOURNAL*.

Harold Bates, who has been associated in the construction engineering department of the Connecticut Company, New Haven, Conn., with Charles R. Harte for more than ten years, has resigned to go with the Winchester Repeating Arms Company, where he will be connected with the sales engineering department. At first his work will be of a general nature, with particular reference to developing marketing methods for the products of this company.

Arthur W. Thompson, president of the Philadelphia Company, Pittsburgh, Pa., holding company of the Pittsburgh Railways, was presented, on Nov. 15 a testimonial from the employees of the Baltimore & Ohio Railroad, of which he was formerly vice-president. The testimonial was in the form of an album, said to be one of the finest books ever made in this country. It is entirely of handwork. The covers are of lambskin done in blue, embossed in gold inside and out, with a silk lining. In the center of the front cover is the name of the recipient in gold.

C. C. Moyer has been appointed superintendent of the Columbus, Delaware & Marion Electric Company, Columbus, Ohio, succeeding J. H. Lahrmmer, deceased. Mr. Moyer has been continuously connected with the company for the last seventeen years. He joined the organization in 1902 as a conductor on the Delaware, city division, later in the same year becoming a conductor on the company's interurban lines. In 1909 he was appointed train dispatcher. Two years later he was made chief train dispatcher, and in 1913, assistant train master. He became train master in 1917 and continued in that position until his appointment as superintendent. Mr. Moyer will make his headquarters in Delaware, Ohio. The system there consists of more than 60 miles of city and interurban lines.

Russell W. Stovel has been appointed a consulting engineer of Westinghouse, Church, Kerr & Company, Inc., New York engineers, and, as a member of that organization, will devote his entire time to the company's electrical and mechanical work. Mr. Stovel recently returned from France, where as Lieutenant-Colonel of Engineers, he served as chief of the Terminal Facilities Division of the Army Transport Service. He has had an unusually comprehensive experience in the electrical and mechanical problems connected with central power station and steam railroad electrification work. He was graduated from McGill University in 1897 with the degree of Electrical Engineer. He had direct charge of the Chestnut Hill electrification of the Pennsylvania Railroad, the Elkhorn Grade electrification of the Norfolk & Western Railroad and the electrification of the New York Connecting Railway linking up the lines operating into New York with those from New England.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER
SALESMAN AND PURCHASING AGENT
ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Storm Reports Increase Sales of Sleet Cutters

Medium Sized Stocks Now on Hand Are Expected to Vanish With First Rush of Orders

Prospects of a coming cold snap are rapidly increasing the sales on sleet cutters according to the latest information received from manufacturers.

The Weather Bureau at Washington reports strong north west winds along the middle and north coasts with light local snows from the lake region and upper Ohio valley eastward, and this, it is believed, will be sufficient warning to the railways to prepare for snow and sleet.

SMALL STOCKS ON HAND

Stocks are only moderate and it is expected will be cleaned out by the first big rush of orders. Manufacturers are now engaged in adding to their stocks as rapidly as labor will permit, although up to this time, they were reluctant to do so, in order to keep their forces working on other products which were bringing a ready sale.

Sales of sleet cutters up to the present time have been fair, but not up to the mark of last year. According to one manufacturer, the railways would rather take a chance of operating throughout an entire winter hoping that nothing worse than a mild season would be encountered than expend a fairly small sum in anticipation of a condition they may not be called upon to face. Once the bad weather sets in, however, they are not slow to place comfortably sized orders, as has been evidenced recently, although it is claimed that they are willing to gamble up to the last minute.

Deliveries can be made from stock on medium sized orders. On large orders, partial shipments will be made on receipt of order and the remainder at a later date depending largely on shop conditions and orders on hand.

Hand-Brake Prices to Go Up

Good Deliveries if Ordered From Stock Otherwise Two to Three Months Is Required

Sales of hand brakes for the first six months of 1919 were almost double the sales for the corresponding period of 1918, according to reports received. Recent sales, however, show a decided falling off. This, however, is not unusual as a large volume of orders during the last quarter of any year is not expected.

BUYING IS IRREGULAR

The buying has been and still is irregular. A large car order will be given and later a hand-brake order will be placed. Again, numerous orders result from cars which are being rebuilt. There have been some large individual orders placed during the year, but not nearly so many as there should have been.

A price increase is looked for before the end of the present year. This is due to the increases granted foundry men and

iron workers, which have been noted from time to time in these columns. Materials also are higher, but the companies are endeavoring to take up as much of the increases as they can absorb. Labor in addition to forcing up prices has also slowed up deliveries. At the present time deliveries can be made on standard equipment from stock. However, it is only from stock that any reasonable delivery can be made. One well-known manufacturer advises that on any type of brakes which are not carried in stock no quotation under three months will be given.

Payment by the railways has been slow of late although previously this condition was more satisfactory. Some of the roads are meeting their bills promptly while others are taking ninety days or longer.

At this time it is not known just what the price increase may amount to, but from present indications it is assured that a rising market will be effective for some time.

Good Deliveries on Tie Tamping Tools

Fall Orders May Deplete Stocks—Every Effort Being Made to Increase Production

Hand tamping tools have advanced 10 per cent effective from Nov. 1. Production has increased during the past month in spite of difficulties in obtaining steel and coal, but must continue to increase if present stocks are to be built up. The supply on hand is decreasing at a lively rate and with normal sales, will last eight to ten weeks.

MECHANICAL TAMPER SALES LIGHT

Up to Oct. 15, several tool making plants were tied up with strikes which caused a curtailment in production and a delay of three to four weeks in shipments of orders. These plants are now making considerable headway toward completing orders accepted before the strike although deliveries, which were a week to ten days behind, are back two to four weeks. At the present it is doubtful whether manufacturers will be able to get enough stock ahead to fill spring requirements. If any further trouble develops, railway companies, which have not been forehanded in placing orders for their needs, probably will be seriously inconvenienced.

Owing to uncertainty as to the future status of the steam railroads and the decreased earnings of electric railways, orders have been unusually light for pneumatic tie tampers for the past few months. This has given the manufacturer an opportunity to catch up on orders, and deliveries can now be made in five to six weeks on complete sets, including the tampers and necessary tools. The tamping tools can be furnished out of stock.

The feature of recent sales of mechanical tampers has been the increasing number of outfits purchased by electric railways for tearing out asphalt and concrete paving, for drilling bond holes in rails, and for other uses supplementing the original purpose for which the outfit was designed.

Coal Shortage May Force Shut Downs in West

Bituminous Coal Production During Strike 29 Per Cent of Normal—Men Reject Operators' Proposals

Shut downs may occur in the Middle West during December unless conditions which are rapidly reaching a critical stage there are relieved within the next two to three weeks. Conditions in the east are slightly better although all surplus stocks are vanishing rapidly. Everywhere schedules are being reduced and many outlying localities are reported to be operating only from 50 to 70 per cent of their cars.

At one of the largest coal receiving companies in the Greater New York district, it has been learned that shipments of coal to tidewater were reduced 50 per cent during the week of Nov. 22-29, to permit all coal mined during a portion of this period to be shipped to the West and North. This may temporarily relieve some railways and public utility companies, but on the whole the amount shipped will scarcely be a drop in a bucket as every one is now in the market and it is a question of having the government fuel administrators distribute what little coal there is available.

RAILROADS CONFISCATE COAL

Railroads over which coal is being carried have in some instances started confiscating car after car for their own use. Three different companies within the past two weeks are reported as having lost as high as thirty cars of coal and in one instance sixty cars were taken.

Reports from the conference in Washington, D. C., where representatives of the coal miners and coal operators have been called before committees, are to the effect that coal operators claimed to have granted all that they possibly could in the increase of 15 cents a ton which would represent a 23.2 per cent increase to pick miners and a 35.1 per cent increase to machine workers. The miners, however, rejected this offer without making any counter proposal.

PRODUCTION AT LOW POINT

Production of bituminous coal, for the week ended Nov. 8, during which the strike was in progress, according to latest reports from the Geological Survey, is estimated at 3,477,000 tons, or approximately 29 per cent of the average for the four weeks ended Oct. 25, in which production was at the highest rate attained this year.

Production for the week of Nov. 8 was the lowest recorded in recent years, for no strike has ever before affected all union mines at the same time. The daily average output in the week, of 580,000 tons, was 54 per cent greater than on Saturday, Nov. 1, the first day of the strike.

For the second week of the strike production was 33 per cent of normal as compared with 29.4 per cent during the first week. From reports received since Nov. 15, it is believed the tonnage being mined is just about the same as was recorded during the first two weeks and that the final reports will show production not more than 35 per cent of normal for this period.

Deliveries on Track Brooms in Less Than a Week

Stocks in Good Shape and Fair Sales Being Made—Winter Season Creates Big Demand

Wire brooms and brushes in reasonable quantities can be delivered within two to three days of receipt of order. On rattan brushes, about a week is required, one company making up brushes to order in that length of time.

Up to the present time, sales have only been fair, probably due to the mild weather which has been prevalent over the country. As the first quarter approaches, sales usually take an upward spurt and hence good sales are expected within the next four to six weeks.

Production for the past month has been above normal although there was little done previously. Labor troubles have affected manufacturing to some extent, but all demands can be met out of surplus stocks which are sufficient to last a number of weeks with normal sales.

Prices have advanced slightly, but this evidently has not been a check to the buying, which although rather light so far, has been regular.

Bond Tester Sales Increase

Prices Now Lower Than Those in Effect at the Time Armistice Was Signed—Four Weeks for Deliveries

Sales of bond testers declined somewhat during the war, but business is now picking up again and seems to be rapidly nearing pre-war demand.

No attempt is made by manufacturers to carry a stock of bond testers except by branch offices and agents whose samples often are used to take care of urgent orders, since factory deliveries in virtually all instances can be made in four weeks. This, as a rule, is satisfactory to purchasers.

Bonds are usually tested during spring, summer and fall, but now there is an increasing tendency to test bonds during the winter months, due to recent mild winters and the realization that bonds must be maintained in the best possible condition to keep down operating costs. This tendency to test bonds during winter months has resulted in orders for bond testers.

Prices have not increased recently; in fact, prices were reduced shortly after the armistice was signed and these are still in effect.

Window Glass Scarce

Acute Shortage of Stocks Has Developed—Labor Troubles Keep Down Production—Long Deliveries Rule

Purchasing agents who failed to place orders for window glass requirements are now faced by long delivery quotations, if they are possible to obtain any at all, and by prospects of an increase in prices dependent upon the action of glass blowers and glass workers who have been holding up production in some sections. Stocks are badly depleted especially those of heavy glass of which there is little or none to be had. The greatest demand is for heavy glass of the 39-oz. size or what is commonly called 3/16 in. Recently two car builders placed inquiries for large amounts but were unable to get any glass of this size. Heavy demands also have been made for the 34-oz. and for the 29-oz. variety. Delivery of from eight to twelve weeks on a limited supply of the lighter grades are being quoted by one large jobber.

Prices are firm. Quotations as of Nov. 18 are as follows: On car window glass, first three brackets, A and B quality, New York, there is a discount of 77 per cent; on car window glass, of double strength, AA quality, New York, 79 per cent off and on car window glass, double strength, BB quality, New York, the discount is 81 per cent from jobbers lists based on the official list of March 1, 1913.

Mr. Lincoln Joins Lincoln Electric Company

Paul M. Lincoln, for many years commercial engineer of the Westinghouse Electric & Manufacturing Company, has resigned from that organization, effective November 1, to take active charge for the Lincoln Electric Company, Cleveland, Ohio, of its motor application engineering.

Mr. Lincoln is a prominent figure in electrical engineering circles, having designed and installed the first hydro-electric power plant at Niagara Falls and subsequently directed its operation for a period of six years. He also developed the first high-tension voltage transmission line and is to-day one of the best known authorities on this subject. Among many other inventions, he perfected a synchronizer especially adapted by the Lincoln Electric Company for paralleling large electric alternators. For this he has received different medals and awards. Mr. Lincoln was president of the A. I. E. E. in 1914.

Scrap Iron and Steel Advancing

Short Lengths of Steel Rails in Fair Demand—Scrap Dealers Holding Out for Higher Prices

Within the past four weeks there has been a very appreciable stiffening in the scrap iron and steel market, with but little demand, except for cast iron, accompanying the advance in price. Scrap dealers who have been watching the pig iron market are reluctant to sell their holdings at present prices, but are waiting for a further advance.

A firm conviction that the steel strike is now virtually over but that, nevertheless, a lessening in production must inevitably result has been responsible for the renewed firmness in scrap. Besides, a number of gondola cars have been released to the dealers, offering an opportunity to move accumulated stocks.

Reports from Cincinnati are to the effect that short lengths of steel rails are being purchased in fair-sized tonnages. \$22.50 to \$23 per gross ton was quoted on Nov. 11 for steel rails for melting in this market. This price has held and in numerous instances \$24 has been paid in the Chicago and Pittsburgh districts for heavy steel scrap.

Malleable scrap is becoming very scarce, it is reported, under a heavy demand.

Since Nov. 11, several scrap products have increased considerably. According to Pittsburgh quotations of Nov. 18, rerolling rails have advanced \$1, at \$29 to \$30; heavy steel scrap \$1, at \$22 to \$23; while railroad malleable is up \$2 to \$3 at \$22 to \$23. Old iron car wheels at \$25 to \$26 and steel car axles at \$28 to \$29 have not been affected by price increases.

No changes are recorded in any of the above quotations for Nov. 25, with the exception of those for car wheels, which in the Chicago and Philadelphia markets are up \$2, although the price in Pittsburgh remains the same as last week.

Heavy Culvert Sales Predicted for Fourth Quarter

Producers Have Difficulty in Getting Steel—Deliveries Good Except in a Few Localities—Price Advance Likely

Recent sales of iron culvert show a very great improvement and although the Fall and Winter months are really the off-season, reports from a number of culvert jobbers indicate that for this period of the year more business is being booked than ever before. Sales reports for October and the first half of November indicate that the fourth quarter may break all records. Although there is little railway or railroad work now being done, buying of metal culverts is regular and a very healthy condition exists due to the influx of finances from the Government in its Federal aid work.

Due to the great momentum that the road work in the United States has taken on, it is believed that conditions will continue to improve. Sales for the first half of the year were approximately 10 per cent less than for the corresponding period last year. This, however, was a readjustment period and that condition was rather to be expected.

Prices are as firm as they have ever been in the culvert industry and due to the recent upward tendency in steel and iron it is expected that advances will have to be made. The prices have not advanced recently and it is believed the new schedule of prices, if such becomes necessary, will not be announced until after the first of the year.

Individual orders of considerable size are reported from different culvert companies, but these are confined mostly to counties which are contracting for considerable road work. Naturally the scarcity and high price of labor are two very important items and have had much to do with delaying needed work.

At the present time good deliveries can be obtained from stocks of different jobbers, but owing to the lessening of shipments of raw materials to the rolling mills, deliveries later are expected to be much extended, especially if this phase of the situation does not improve.

Rolling Stock

Beech Grove (Ind.) Traction Company, is in the market for three Birney safety cars.

Southern Michigan Railway, South Bend, Ind., has purchased one snow sweeper and one new trailer.

Washington (Ind.) Street Railway has purchased three safety cars from the National Safety Car & Equipment Company.

Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., is reported to have purchased ten safety cars for operation in South Bend.

Chicago, North Shore & Milwaukee Railroad Company, Highwood, Ill., is reported to have placed orders for ten cars and additional equipment totaling \$800,000.

Los Angeles (Cal.) Railway Corporation is advised by the Railroad Commission of the State of California, in a decision handed down Nov. 12, to purchase 400 safety cars at a cost of \$2,800,000. Reference to this decision is made on page 959 of this issue.

Track and Roadway

Montgomery Light & Traction Company, Montgomery, Ala.—The Montgomery Light & Traction Company plans a general rerouting of its cars and the elimination of about 2 miles of track.

Tidewater Southern Railroad, Stockton, Cal.—The Tidewater Southern Railroad will begin the construction of a line to Fresno, Cal., early in 1920. The right-of-way of the proposed line is now being surveyed.

Indianapolis (Ind.) Street Railway.—George Lemaux, member of the Indianapolis Board of Works, has announced plans for the construction by the Indianapolis Street Railway of a line from Virginia Avenue to Kentucky Avenue on South Street, and out Kentucky Avenue. The board will order the laying of double tracks in Ohio Street for the accommodation of interurban cars.

Arkansas Valley Interurban Railway, Wichita, Kan.—The Arkansas Valley Interurban Railway is reconstructing its terminal facilities at Wichita. A passenger and freight station is under construction and 5 miles of track are being laid to enable the company's cars to enter Wichita over its own right-of-way.

United Railways, St. Louis, Mo.—Rolla Wells, receiver for the United Railways, has applied to the Federal District Court for permission to purchase 300,000 granite paving blocks at 8 cents each. Mr. Wells has also asked permission to lease the property at 3108-12 Laclede Avenue to the Board of Education for three years at a monthly rental of \$65.

Binghamton (N. Y.) Railway.—The Binghamton Railway is extending its lines from Hill Crest to the plant of the Universal Can Company at Hiresville.

Oklahoma Union Railway, Tulsa, Okla.—The Oklahoma Union Railway will extend its line to Okmulgee via Beggs and the Beggs oil district. The Okmulgee extension will be built early in 1920 if conditions continue favorable.

Dallas (Tex.) Railway.—The Dallas Railway reports damage amounting to \$25,000 due to the excessive rain in Dallas on the night of Oct. 31. The downpour put out of commission seventy-five of the company's cars. Water in many places was 1 ft. or more deep on the tracks and the roadbed on unpaved streets was badly washed.

Saskatoon (Sask.) Municipal Railway.—The City Council of Saskatoon has voted to extend the Twentieth Street line of the Saskatoon Municipal Railway at a cost of \$1,818.

Sherbrooke Railway & Power Company, Sherbrooke, Que.—The Sherbrooke Railway & Power Company is extending its railway lines at a cost of \$50,000.

Toronto (Ont.) Civic Railway.—The Ontario Railway Board has approved plans for the construction of an extension of the Bloor Street line of the Toronto Civic Railway.

Toronto (Ont.) Railway.—The Ontario Railway Board has ordered the Toronto Railway to complete its Pape line extension by July 15, 1920. Construction is to begin not later than April 15 next.

Power Houses, Shops and Buildings

Pittsburgh (Pa.) Railways.—The receivers of the Pittsburgh Railways have received from the United States District Court permission for the purchase of a piece of property worth \$3,000 in the Lebanon Heights' district on the Washington Street line, the property to be used for the making of improvements in the service. The property, the receivers agree, will be placed in trust.

Trade Notes

National Carbon Company, Inc., Cleveland, Ohio: Brush Bulletin No. 13 describing armature and field coil tests and methods for locating troubles.

Gaston, Williams & Wigmore, New York, N. Y., announce the addition to its staff of G. A. Trube, formerly export manager of the Westinghouse Airbrake Company.

Sanford-Riley Stoker Company, Ltd., Worcester, Mass., announces that G. Brennan has been transferred to the sales department of the Chicago office. He will be succeeded by Otis C. Sheldon.

Acme Electric & Manufacturing Company, Cleveland, Ohio, announces that C. H. Bunch, formerly chief engineer of the Electric Products Company, has become secretary and engineer of the company.

Pierce Fuse Corporation, Buffalo, N. Y., announces the appointment of P. S. Klees, as vice-president and sales manager of the company. He was formerly manager of the Franklin Incandescent Lamp Works, New York City.

Canadian Westinghouse Company, Ltd., Toronto, Can., announces that H. U. Hart, chief engineer of the company, has been appointed general manager, succeeding F. A. Merrick. Mr. Merrick is still vice-president and a member of the board of directors.

Chicago Mica Company, Valparaiso, Ind., announces that L. P. Frederick, formerly of the research engineering department of the Westinghouse Electric & Manufacturing Company, is now consulting engineer and production manager for the company.

British Aluminum Company, Ltd., London, Eng., announces the appointment of Ernest B. Pannel as special sales engineer who will be located in New York City. For the past four years he has acted as manager to the Canadian head office of the company in Toronto.

Railway & Industrial Engineering Company, Pittsburgh, Pa., announces the appointment of Harold H. Rudd, as vice-president and secretary of the company. He has been with the Westinghouse Electric & Manufacturing Company since 1904, where he has spent most of his time in the commercial department.

Norma Company of America, N. Y., announces that O. P. Wilson, formerly assistant general manager, has been elected vice-president of the company. He was for many years one of the head buyers in the purchasing department of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

Kelvin Engineering Company, Inc., New York, N. Y., has organized a new department to do general engineering and contracting work in this country and in Latin America. This department will be in charge of Carlos Lobo, formerly borough engineer, Department of Water Supply, Gas and Electricity, Brooklyn, N. Y. The company is now prepared to execute contracts for furnishing and erecting electrical and industrial machinery and equipment.

Handy Supply & Manufacturing Company, Cleveland, Ohio, announces that E. H. Martindale has accepted the position of president and general manager of the company. He graduated from Case School of Applied Science in 1908 and is widely known as a brush expert, having been with the National Carbon Company for the past ten years. He is a member of the board of directors of the A. I. E. E. and has served two years as chairman of the Industrial and Domestic Power Committee. During the war he was a captain of engineers and spent one year in France.

General Electric Company, Schenectady, N. Y., has leased the rigid-conduit business of the American Conduit Manufacturing Company, New Kensington, Pa. This business, which will continue to be operated at New Kensington, will be conducted by the Sprague Electric Works. The Galvanite and American brands of rigid conduit will be continued, and no change is contemplated in the terms or conditions under which the trade has been dealing with the American company. Plans are being made for the enlargement of the plant, and additional equipment will be installed. There will be no change in the personnel of the American Conduit Manufacturing Company, according to a statement by D. Hayes Murphy, president of the company, but the name will be changed to the American Wiremold Company, and it will concentrate upon the manufacture of "Wiremold" surface raceway and "Wireduct" non-metallic tubing at Hartford, Conn., where the company has taken over the plant of the Franklin Lamp Works. H. B. Kirkland, vice-president, will divide his time between the Sprague Works in New York City and the American Wiremold Company at Hartford.

New Advertising Literature

Harvey Hubbel, Bridgeport, Conn.: Circular No. 183 on Hubbell Current Taps.

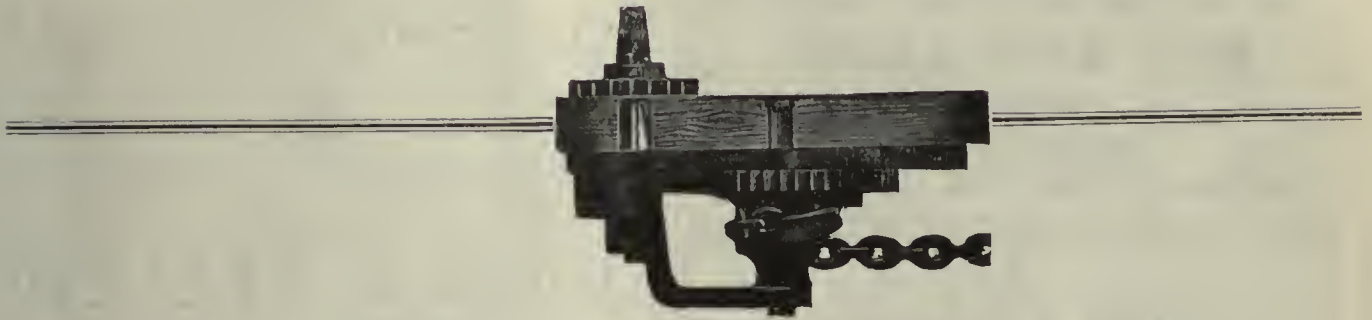
General Electric Company, Schenectady, N. Y.: Bulletin No. 47530 superseding Bulletin No. 47503, and describing its type CP air circuit breakers.

Sprague Electric Works of the General Electric Company, New York, N. Y.: Bulletin No. 47942 on safety panel boards and cabinets.

General Electric Company, Schenectady, N. Y.: Bulletin No. 47702A superseding No. 47702 and covering rheostat and compensator operating mechanisms.

Westinghouse, Church, Kerr & Company, New York, N. Y.: Illustrated circular on shops, containing pictures of a large number of shops built for manufacturing companies and railroads.

Merrill Company, San Francisco, Cal.: Booklet describing and illustrating the Nordstrom lubricated plug valve, originally designed for use in mining and milling operations, but now being applied in the general engineering field.



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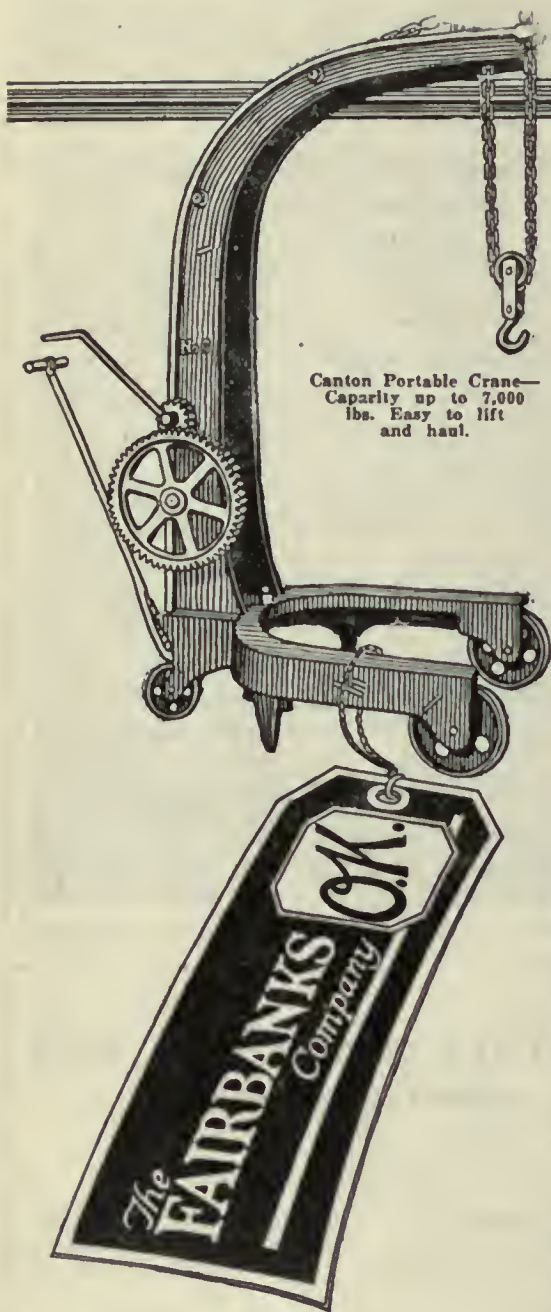
Surplus \$1,000,000

Und. Profits \$363,051

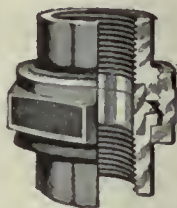
Resources \$23,743,000

Offers to dealers every facility of a New York
Clearing House Bank.

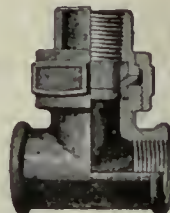
The result of the best
practice in electric rail-
way work is recorded
every week in the Elec-
tric Railway Journal.



Canton Portable Crane—
Capacity up to 7,000
lbs. Easy to lift
and haul.



Dart Female Union.
Note the ground
bronze seats.



Dart Tee Union Elbow
on the Outlet—no
place for sediment.



Dart Tee Union on the
Run—the flow is not
hindered at the joint.



Dart Union Elbow—
male to female.

In Shop and Power Plant let

Your shop foreman—the chief in your power plant—each relies on products bearing “The Fairbanks Company O. K.” They know that anything from a Fairbanks Branch House can be trusted for long and satisfactory service. Here are three lines which are particularly useful in power houses, machine shops and freight houses:

CANTON PORTABLE CRANES AND HOISTS

Don't take six men's time to lift a heavy burden when one man can do it with a Canton Portable Crane.

In freight-handling, in setting up machinery, in removing heavy parts for repairs, a Canton Crane will soon save its cost. Many

special uses will be found for it—such as pulling cables into conduits by means of its winding-drum. Roller-bearing wheels make it easy to move about. The safety of your men is assured by “The Fairbanks Company O. K.” given only after vigorous tests.

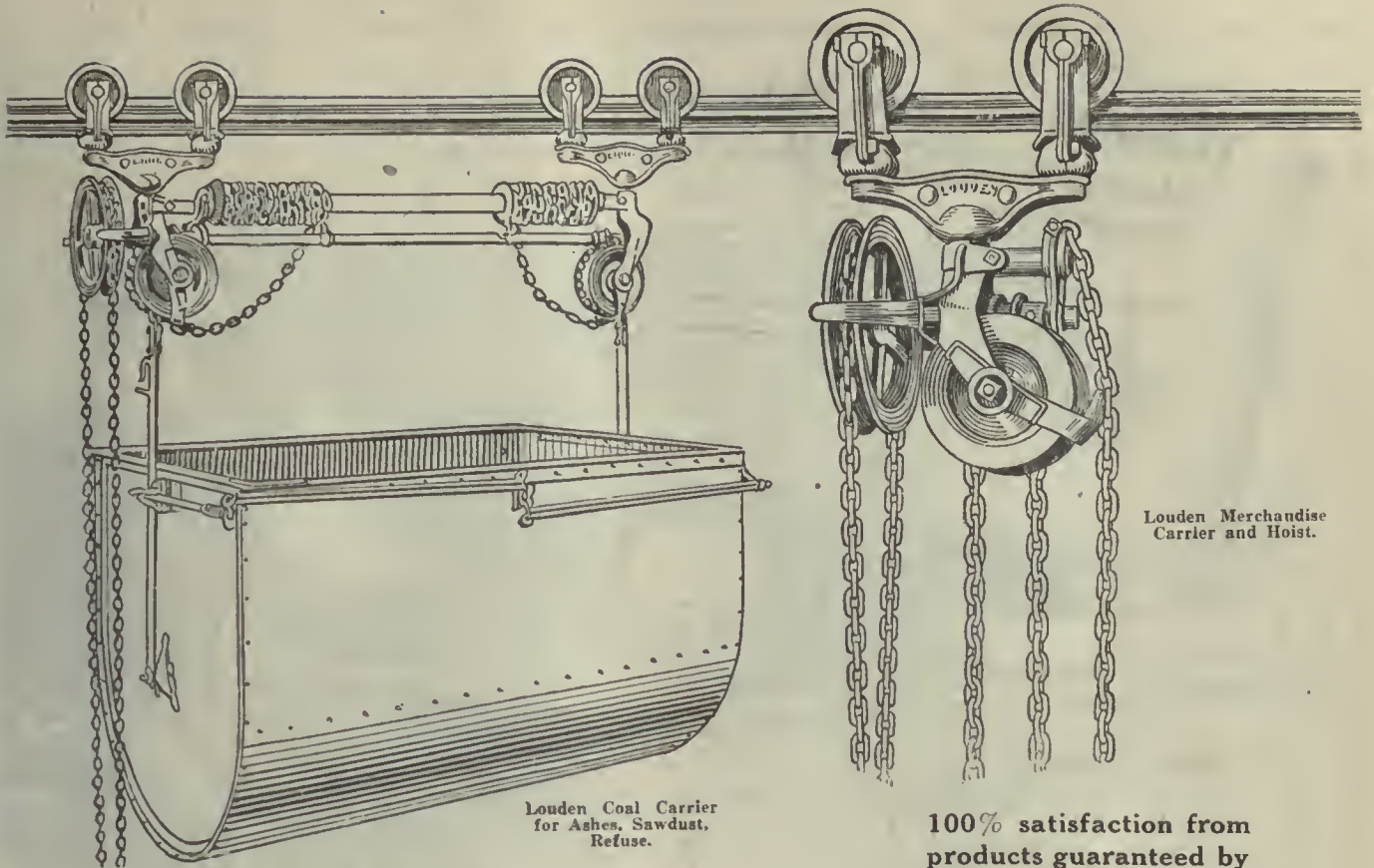
LOUDEN OVERHEAD CARRIERS

Louden Carriers transport materials of all kinds. The coal carrier shown above is very useful in the boiler room to handle coal and ashes; the merchandise carrier

finds a hundred uses in the store room, the freight terminal and the warehouse. Put your interior transportation problem up to the nearest Fairbanks Branch House.

The
FAIRBANKS
Company





Louden Coal Carrier
for Ashes, Sawdust,
Refuse.

Louden Merchandise
Carrier and Hoist.

FAIRBANKS serve you

DART UNIONS

There are no drip marks on the floor under a Dart Union. Ground bronze seats, swedged in, make a tight joint without forcing. Every time you "remake" it, the joint

will be tight. You won't have to depend on corrosion to close up little leaks. Ask the nearest Fairbanks Branch House for a free sample.

Buyers know that "The Fairbanks Company O. K." stands for dependable merchandise at fair prices. When you need any sort of mechanical equipment, call on the nearest Fairbanks Branch House to furnish it.

THE FAIRBANKS COMPANY

Administrative Office: NEW YORK

BRANCH HOUSES:

Albany
Baltimore
Birmingham
Boston
Bridgeport
Buffalo

Havana, Cuba

Chicago
Detroit
Hartford
Newark
New Orleans

London, England

Paris, France

New York
Paterson
Philadelphia
Pittsburgh
Providence

Birmingham, England

Rochester
Scranton
St. Louis
Syracuse
Utica
Washington

Glasgow, Scotland



Mill, Mine and
Railway Supplies



Valves



Trucks and
Wheelbarrows



Power
Transmission



Machine Tools



Engines and
Pumps



Scales



Automobile
and Service Station
Equipment

The
FAIRBANKS
Company





Let Figures Speak

and prove to you as they have to this man that

Thermite Insert Welds

are money savers

The above report is for 3 years where a 5-minute car service is maintained during the greater part of the day, using cars of weights ranging from 35,000 lbs. to 70,000 lbs. The track welded was 134 lbs., 9-inch grooved rail.

Send for Pamphlet 1232

METAL & THERMITE CORPORATION

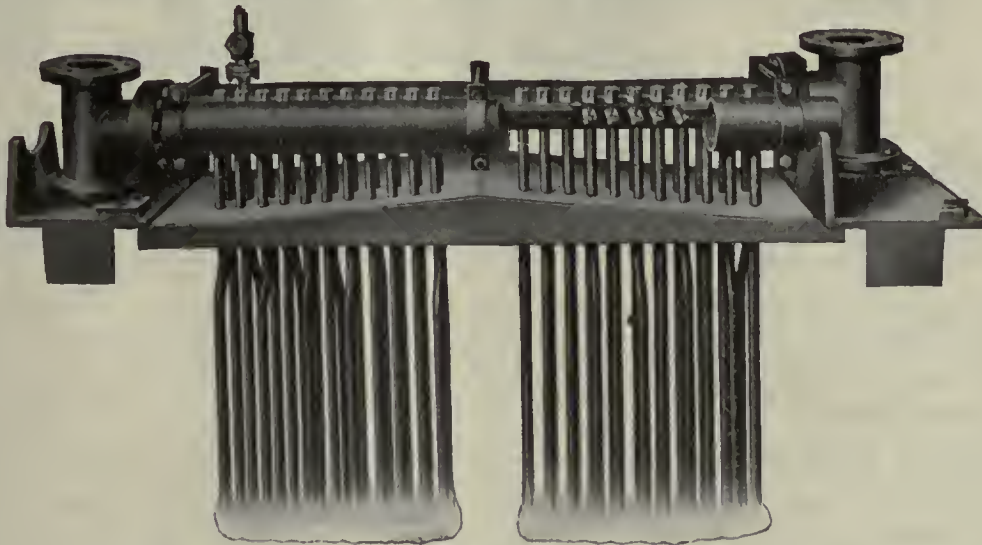
120 BROADWAY, NEW YORK

329-333 Folsom St., San Francisco
 7300 So. Chicago Ave., Chicago

Factories located at Chrome, N. J.; Wyandotte, Mich.; East Chicago, Ind.; Jersey City, N. J.

15 Emily St., W. Toronto, Ont.
 1427-1429 Western Ave., Pittsburgh, Pa.

20 H. P. MORE FREE WITH THE ELESKO SUPERHEATER



YOU PAY FOR 100 H. P.

That's fundamental. You can't get away from it unless some philanthropist gives you your fuel.

But if you use saturated steam you may fall short of enough power from your engine to meet increased demands, because you won't have sufficient boiler capacity to supply the steam.

Install the Elesco Superheater.

AND YOU GET 20 H. P. MORE FREE

because it increases your boiler capacity sufficiently to supply the additional steam demanded by an increased engine load. There is no guess work about the advantages of superheat when you apply it correctly. You can install the Elesco in your power plant because

the Elesco is adaptable to any type or size boiler, new or old, without changes to the boiler settings.

It's cost of maintenance is less than that of the boilers. Many installations have operated for years without attention. The coupon brings you complete details. Send it to us today for Bulletins BT-1 and BT-2.

LOCOMOTIVE SUPERHEATER CO.

General Offices—30 Church St., New York

Pittsburgh—Oviwer Bldg.

Chicago—Peoples Gas Bldg.

FOR ALL TYPES
AND SIZES



OF STATIONARY
BOILERS

USE THIS COUPON

LOCOMOTIVE SUPERHEATER CO.

E-12-13

Please send your Bulletin BT-1 and BT-2

Name

Title

Company

Address

Thirteen Years of

Write for your copy.

The new Green Book, PROGRESSIVE COMBUSTION, is the most complete treatise ever issued upon Coals of the World and their proper burning.

A request upon your company letter-head, giving your position, will bring you this book. Write Dept. C today.



Birmingham
Railway, Light
and Power Co.
Birmingham, Ala.

*Backed by 22 Years of
Specialized Experience*

Green Sealflex Arch
Green Pressure Water Backs
Green Steam Jet Ash Conveyors
Green Cast Iron Ash Tank

GREEN

Coal Saving at Birmingham

TWENTY-SEVEN Green Stokers took over the railway, light and power burden of Birmingham, Alabama, thirteen years ago.

When Green Chain Grates replaced hand firing in the Birmingham plant, (of 17,500, rated boiler horsepower) the fuel required per K. W. H. dropped 3 lbs. For 13 years this plant has been saving coal on this scale; for 13 years Green Stokers have been responding to every load demand.

And after those thirteen years of uninterrupted service this organization states that Green Stokers are "easy to repair and inexpensive to maintain."

Green Engineers had eight years of experience before this installation was made. They have been adding to their knowledge of firing characteristics of coals and the possibilities of the Green Chain Grate, every year since.

Driving engine requires 30 lb. steam per hour for largest stoker — no other steam consuming auxiliaries—all efficiency figures quoted are net. No clinkers—least attendant labor.

The satisfaction voiced in this 13 year old Green installation has

been growing with the years until, to-day, Green Constructive Principles are everywhere considered authoritative.

Today, the Green Engineering Company offers for the solution of your firing problem a

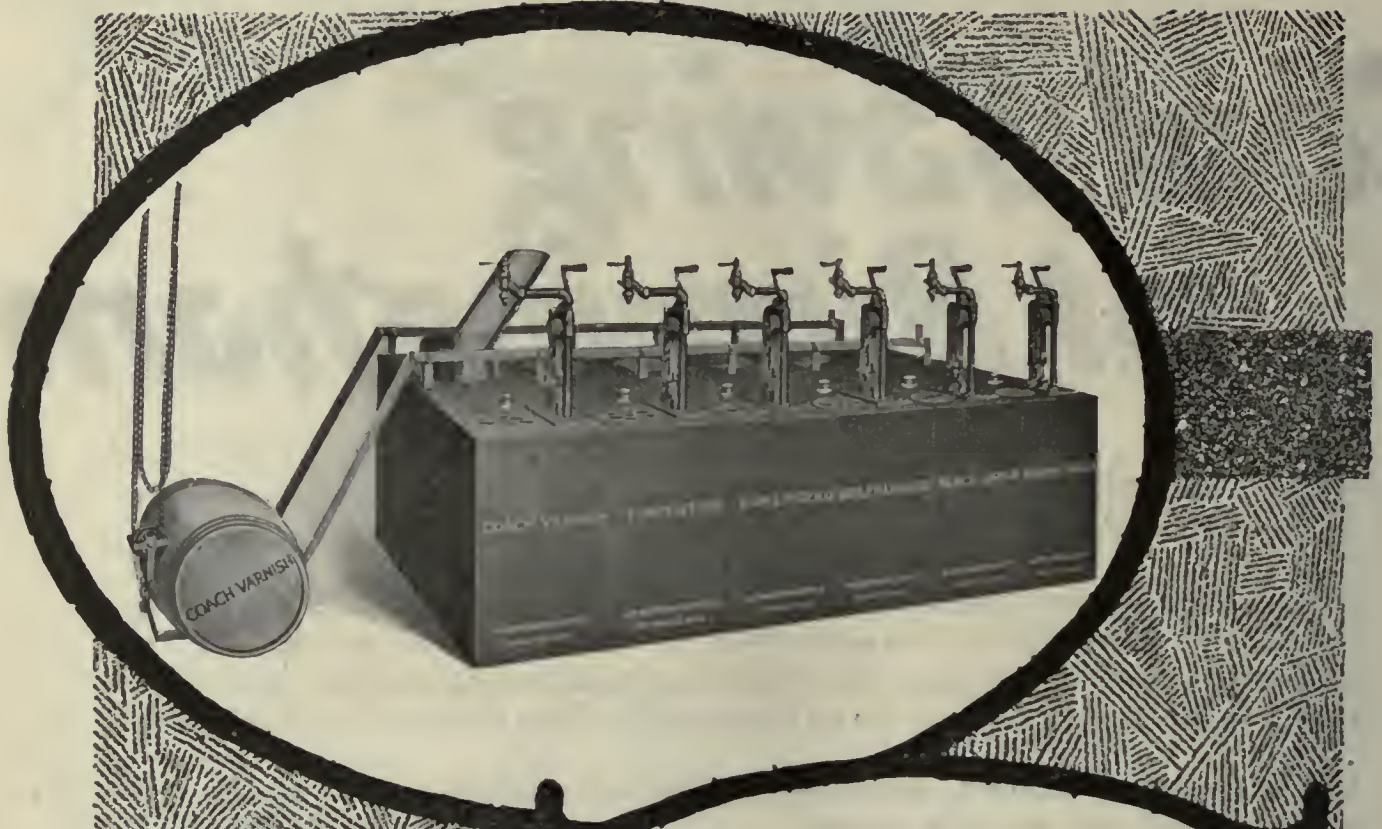
quarter-century of specialized experience.

GREEN ENGINEERING CO.

Main Offices and Shops
East Chicago, Ind.

CHAIN GRATES

"K" Type for Clinkering Coals "L" Type for Coking Coals



EST'D 1865

Higher Fares Or The Zone System

will increase your earnings but this increase alone will not make dividends possible.

Strict economy must be the watchword in your operating department. Oil is an important factor in the operation and maintenance of your rolling stock.

The installation of a

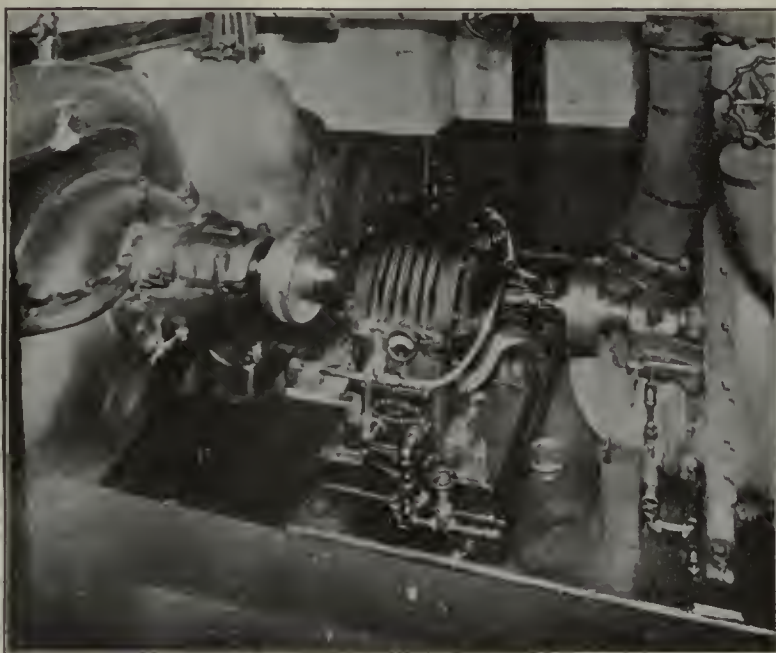
Gilbert & Barker Oil Storage System

will eliminate waste, keep your oil free from contamination and insure full returns from every gallon. The saving in time, labor and oil will quickly repay the cost of installation.

*Just say "Send Bulletin 60."
There are no obligations.*

Gilbert & Barker Mfg. Company
14 Union Street
Springfield, Mass., U. S. A.





*Another
fact*

The Auxiliary Drive for Traction Power Stations

IN THIS instance the 125 H.P. Turbo Gear is transmitting the power from a Curtis Steam Turbine to a Wheeler condenser pump, with a reduction of 6 to 1.

The fact that there has been no upkeep cost at all is another indication of its universal fitness for driving power plant auxiliaries.

Besides economy of upkeep, its freedom from wear and tear on bearings — there is no side strain — its perfect forced lubrication and its high efficiency of 98% plus, make it the unusually economical gear for this purpose. Will you let our engineers consult with you on your problems? We have a bulletin for you.

TURBOGEAR

FAST PATENTS

Poole Engineering & Machine Co.
Baltimore, Md.

General Sales Office: 50 Church St., New York



"We Would Not Be Without It"

Such is the statement of the Worcester Consolidated Street Railway Company, Worcester, Mass.

This Terry was installed in 1911. It operates the feed pump for four 820 horse power boilers.

Excellent satisfaction is their criticism of it.

THE TERRY TURBINE

Is built to last—to operate for years without continuous attention.

The simplicity and accessibility of the turbines insures minimum shutdown for repairs.

These and many other features are fully described in Bulletin 251. Write for it.

The Terry Steam Turbine Co.

Terry Square
Hartford, Conn.

T-662

Re-cool Your Condenser Water at the Lowest Cost——



Iowa Portland Cement Co., where Koerting Multi-Spray Nozzles replaced a cooling tower.

You will obtain the maximum cooling effect with the least power and upkeep cost by installing a cooling pond equipped with

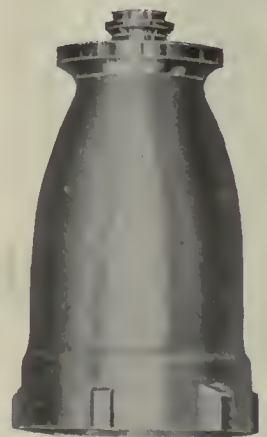
K O E R T I N G Low-Pressure Multi-Spray Nozzler

More efficient and less costly than a cooling tower of like capacity.

Note the double effect of the nozzle. The central helix produces a spray which collides with that produced by the larger helix with the result that the water is broken up into infinitely small parts.

The thorough atomization insures intimate contact with the air and rapid cooling.

Drift and evaporation losses are extremely small. Very low pressure is necessary.



Write for Catalog 6-B

New York

Boston

Pittsburgh

Chicago

Cleveland

Denver

VALVES
INJECTORS
CONDENSERS
SPRAY NOZZLES
CHEMICAL
EQUIPMENT

SCHUTTE & KOERTING

1150 Thompson St.

Philadelphia Pa.

OIL BURNING
EQUIPMENT
EVAPORATORS
DISTILLERS
OIL COOLERS
FEED WATER
HEATERS

New York

Boston

Pittsburgh

Chicago

Cleveland

Denver



Splicing - TAPE - Friction



HERE is not a better or more favorably known black friction tape manufactured than Holdtite. It is heavily coated on both sides with a high grade compound, and is recommended for general electrical work.

Relio is a black, unvulcanized splicing compound that contains no sulphur, is adhesive, and will form a solid waterproof joint without heating. Relio is suitable for either outside or inside work.

United States Tapes
are Good Tapes

United States Rubber Company





Watch him lift the railway truck

A light touch on two controls—and the truck, weighing approximately 10,000 pounds, is lifted and transported swiftly and smoothly *anywhere* in the shop.

It is not so much what a CRANE will save you in handling and labor costs, but what a TOLEDO Crane will save you in CRANE costs. We have striven to make them the BEST Cranes obtainable for the money. You, if you are wise, will make them one of the biggest means of cutting costs and increasing efficiency in your Railway.

The Toledo Bridge & Crane Co.
Toledo, Ohio

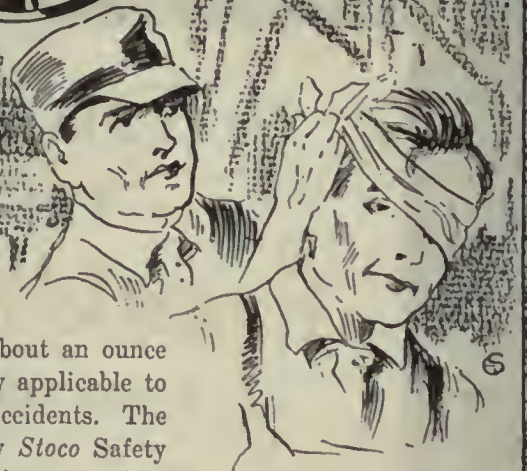
New York Office, 52 Broadway
Philadelphia Office, 2013 Market St.
Pittsburgh Office, 203 Oliver Bldg.
Buffalo Office, 610 Iroquois Bldg.
Boston Office, 141 Milk St.
St. Louis Office, Federal Reserve Bank Bldg.

Cleveland Office, 725 Citizens Bldg.
San Francisco Office, Rialto Bldg.
Chicago Office, 549 Washington Blvd.
Kansas City, Mo., Office, Finance Bldg.
Seattle Office, Hoge Bldg.

Mr. Safety Engineer, don't wait for an eye accident before ordering **STOCO** SAFETY GOGGLES "CELOGLAS" SHATTER-PROOF LENS



The proverb
anent a stitch
in time—not
to mention the one about an ounce
of prevention—is very applicable to
the prevention of eye accidents. The
protection afforded by Stoco Safety
Goggles is fast becoming proverbial
in industrial fields.



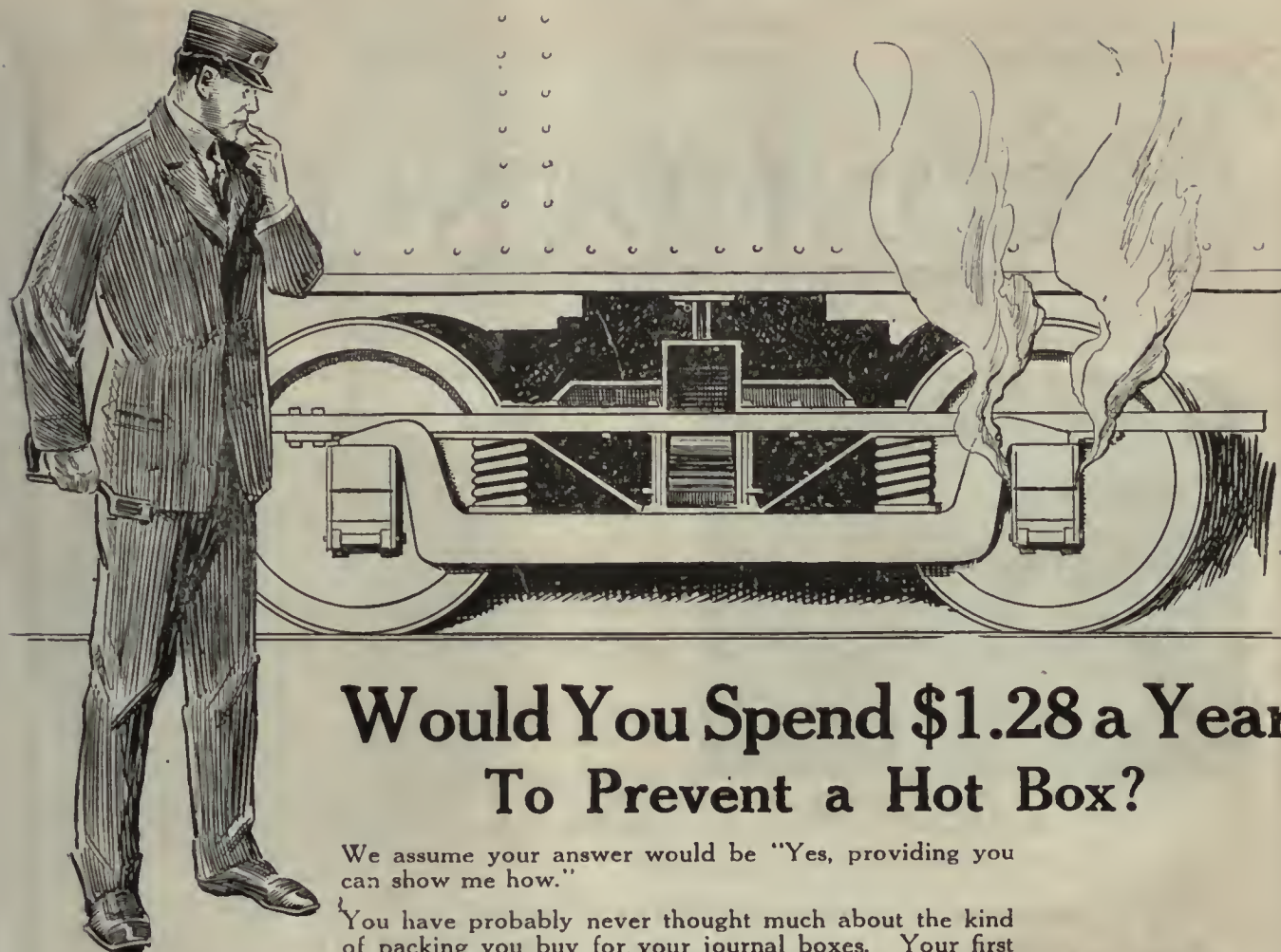
PRICE

(With either easy cable earbows or black elastic headbands)
With clear glass lenses..... \$90.00 per hundred
With Celoglas "Shatter-Proof" lenses....\$115.00 per hundred

A sample of the Stoco Safety Goggle will be sent without charge to Safety Engineers, Purchasing Agents and Superintendents on receipt of request on letterhead.

STANDARD OPTICAL Co

GENEVA, N. Y.



Would You Spend \$1.28 a Year To Prevent a Hot Box?

We assume your answer would be "Yes, providing you can show me how."

You have probably never thought much about the kind of packing you buy for your journal boxes. Your first thought is: Well, it is only waste, so why worry about that.

If you are buying the cheap waste, the difference between that and

Franklin Perfection Journal Box Packing

will be about 8 cents a pound. Using approximately 16 pounds per car a year at 8 cents a pound makes it about \$1.28 per car. For this \$1.28 you minimize your chances for Hot Boxes.

The reason why Franklin Perfection is superior is that it starts out right. It has been properly designed.

We have a factory devoted to its manufacture and have had over 20 years experience in the manufacture of Journal Box Packing. Many now use Franklin Perfection Journal Box Packing and we want you to also.

One of the best arguments we can give is Customers we lose always come back stronger.

Write for Catalog F. C. G17, a Textbook on Journal Box Packing.

The Franklin Manufacturing Company
Franklin, Pa.

CONFIDENCE



A popular type of Ohmer Fare Register for city service

THE Ohmer System of fare accounting has won the confidence of railway men. The number of Ohmer Fare Registers in use is steadily increasing. Expiring contracts are being regularly renewed.

The Ohmer System is a recognized necessity, not a luxury. It is worthy of *your careful investigation.*

Do you want to protect your fare collections? Do you want to cultivate intensively every means of increasing business? Do you care to create and preserve a spirit of co-operation among your conductors?

Do this—Write us at *once* about your fare collection difficulties. We very likely have met and solved the same problems somewhere. You are welcome to our experience without obligation.

Time	Direction	Line No.	Trip	Tickets	Passes	5¢ Fares	Total Cash	Register Number	Total Passes	Date	Identification
4 23P	L	18	0 0 0	0 0 0	0 0 0	0 0 0	\$ 0 0 0	0	7 4 7 0	5	INSB
4 23P	L	18	0 4 2	0 4 7	0 5 6	1 9 8	\$ 0 9 9 0	5	7 4 7 0	5	27
3 34P	O	18	0 3 5	0 3 2	0 3 6	1 6 3	\$ 0 8 1 5	5	7 3 9 3	5	27
2 25P	L	18	0 2 4	0 1 7	0 2 1	1 0 6	\$ 0 5 3 0	5	7 2 9 5	5	27
1 36P	O	18	0 0 7	0 0 9	0 0 8	0 5 0	\$ 0 2 5 0	5	7 2 0 1	5	27
12 27P	L	39	0 0 0	0 0 0	0 0 0	0 0 0	\$ 0 0 0 0	5	7 1 2 7	5	27
12 27P	L	39	0 7 2	0 7 4	0 6 8	2 4 7	\$ 1 2 3 5	5	7 1 2 7	5	14
11 27A	O	39	0 5 9	0 5 5	0 4 3	1 8 9	\$ 0 9 4 5	5	7 0 1 2	5	14
10 38A	L	39	0 3 4	0 3 4	0 1 6	1 3 8	\$ 0 6 9 0	5	6 8 8 8	5	14
9 29A	O	39	0 1 6	0 1 5	0 0 3	0 6 3	\$ 0 3 1 5	5	6 7 6 3	5	14
8 30A	L	39	0 0 0	0 0 0	0 0 0	0 0 0	\$ 0 0 0 0	5	6 6 6 6	5	14

Report from a popular type of Ohmer Fare Register for city service

OHMER FARE REGISTER CO.,
Dayton, Ohio

The Dynamotor

Portable Bonder and Welder

Announcing Change of Name

Owing to the rapid development of our business our former name—

THE LINCOLN BONDING CO.

therefore no longer represents the scope of our service.

Effective October 1st, the name of this company was changed to—

THE RAIL WELDING & BONDING CO.

"OF AMERICA"

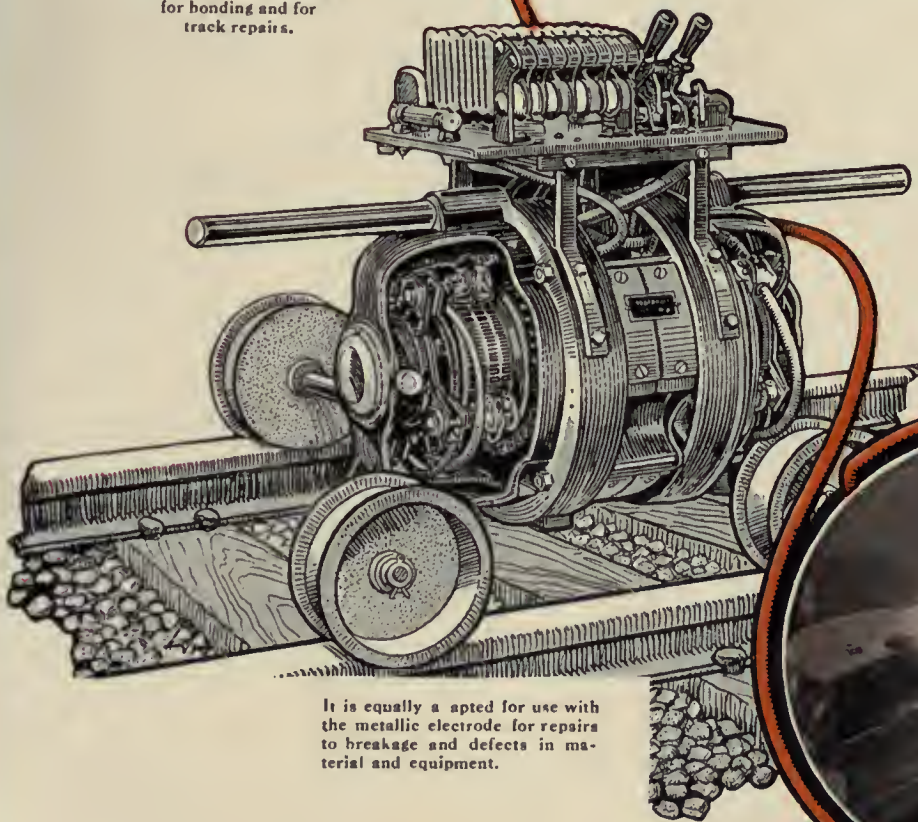
The nature of the service offered by our organization is outlined on the reverse side of this insert.

THE RAIL WELDING & BONDING CO., Cleveland, O.

"OF AMERICA"



The Dynamotor is used for rail joint welding, for bonding and for track repairs.

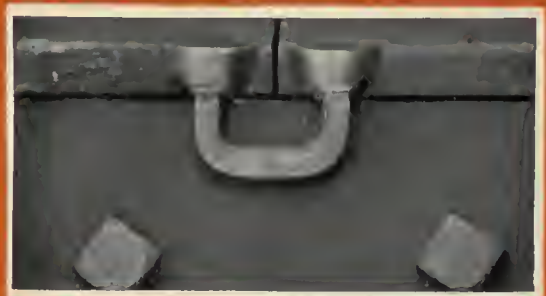


It is equally a apted for use with the metallic electrode for repairs to breakage and defects in material and equipment.



Do ALL Your Welding Jobs

With the DYNAMOTOR (Portable Bonder and Welder)



Bonding, shop welding, track repairs—they're all one to the Dynamotor. It is a complete motor-generator arc welding set in one.



The Dynamotor is a portable arc welding machine which will do **all** your welding and rail-bonding. It is the only machine which gives you the double advantages of the carbon arc for rail bonding and rail joint welding and the metallic arc for building up worn and broken track work and car equipment. The carbon arc fuses the fish plate and rail to a depth of half an inch, thus making a perfect union without the necessity of using bolts and nuts.

The carbon arc process for Bonding in which the arc is formed between the bond and a carbon pencil, melts the steel and the copper into a true alloy by liquefying and intermixing the two metals at their contacting surfaces.

The metallic arc process—suitable only for iron and steel welding—in which the carbon pencil is replaced by a piece of steel or iron wire, is used for repairing worn or broken car equipment and track-work. The job is built up by locally melting the wire into the defective part drop by drop. With the metallic arc vertical and even overhead welding is possible **because the entire weld is not liquefied**, but only the part immediately under the arc.

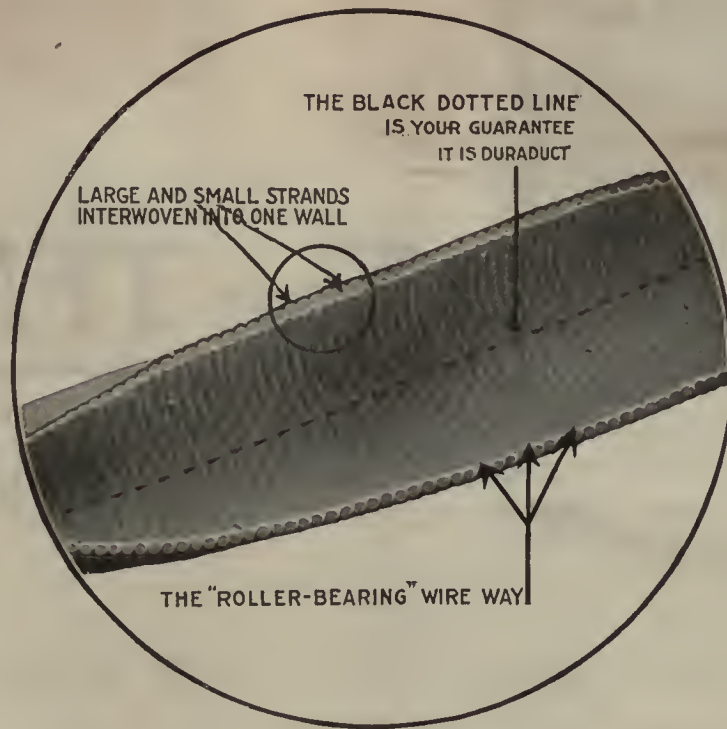
Get the outfit that will do **all** your welding jobs—that offers you the best method for each—**the Dynamotor.**

The Rail Welding & Bonding Co., Cleveland, Ohio

"OF AMERICA"

RAIL WELDING & BONDING CO., 30 Church Street, New York City.

RAIL WELDING & BONDING CO., Fisher Building, Chicago, Ill.



A few reasons for the popularity of DURADUCT

(Reg. U. S. Patent Office)

The special construction shows its value.
The single wall prevents the blistering inherent in multiple wall types of conduit.
The "Roller-Bearing" wireway makes fishing easy.
The black dotted line identifies it.
All good jobbers sell Duraduct.

TUBULAR WOVEN FABRIC COMPANY
MANUFACTURERS • PAWTUCKET • R. I.
A. HALL BERRY • GENERAL SALES AGENT
71-73 Murray Street, New York 9 So. Clinton Street, Chicago

WENDELL & MACDUFFIE CO. 61 Broadway, New York City
Distributors for all foreign countries except Canada
Northern Electric Company, Limited, Distributors for Canada

THE BLACK DOTTED LINE IS THE MARK OF
DURADUCT

9 everyday business errors

1. Neglecting to get receipts when bills are paid in cash.
2. Neglecting to keep receipts where they can be located.
3. Neglecting to check up items in current bills.
4. Inability to keep checkbook balanced.
5. Too easy optimism in starting credit accounts.
6. Careless handling of valuable business papers.
7. Signing documents without knowing their contents.
8. Tendency to establish living expenses which would exceed income and eat into savings.
9. Tendency to invest money on dangerous hearsay — without proper knowledge of facts.

FOR insurance sound

-The TENTH Error

This clipping from a recent newspaper advertisement, tells a valuable story. But it overlooks one of the *biggest* business errors—

Neglecting to use the

SEARCHLIGHT SECTION

It is a bad business error to overlook the opportunities that this Department puts at your disposal.

Whether you wish to buy or to sell—to secure contracts—to reach the men whose services you want or to whom you wish to sell your services

—the “Searchlight” offers you the opportunity to reach the largest possible number of your prospective customers.

"I am a great believer in the synchronizing of the brain and the spine."—JOB E. HEDGES.



Copyright by Pirie MacDonald



THE WORLD has a great deal of respect for the man who combines proper use of the brain and the spine—the man with ability and backbone. The Lord only knows how essential this combination is in our great electric railway industry to-day. Never was there a greater need for common sense and "guts." There are too many fellows of the other sort—the individuals who lack spine—the easy-going, trust-in-God fellows, who wouldn't for the world change their method of doing business because they are afraid to do something different. If it were not for executives with initiative urban transportation might still be confined to the use of horse cars.

The up-to-date, live operator does not wait till bankruptcy is at hand before he goes after a higher rate of fare. He has the confidence of the public authorities and he secures their co-operation in being allowed to prepare for a new system of fares before the schedule is made effective. He knows what other successful managers are doing. He knows that the American Electric Railway T. and T. Association has endorsed registering fare boxes and metal tickets. No experimenting with make-shift devices for him. The question of first price isn't the controlling factor in his decision.

There is a way for railway companies to get 100 per cent of earned revenues. Recent changes in fare schedules—with multiple unit fares and tickets at reduced rates—have made this more difficult to secure. Occasionally a railway executive is caught napping and hurries thoughtlessly into the purchase of "any old thing" to hold the tickets. He soon finds that this will also hold slugs and defective tickets and will tie up his cash so the conductors need a constant supply of additional change. He also finds that the conductors have been relieved of responsibility to such an extent that they lose interest in this part of their work. In the end he must "scrap" this equipment and turn to more efficient methods.

Why not start right? Why wait until the crisis comes before turning to experiment in the all important matter of fare collection? If the experience of the 160 or more properties which we have equipped is worth anything, it is worth looking into. We have encountered and overcome all kinds of difficulties. We have helped others save millions of dollars. We can help you.

Our experts are at your service to tell you all that is known about fare boxes and metal tickets. We await your invitation.

JOHNSON FARE BOX COMPANY

Jackson Boulevard and Robey Street, Chicago

50 East 42d St. New York



Service That Suits the Sales Story to the Selling Season

That is Collier Service.

Geographical and weather conditions are at all times given careful consideration so that the cards displayed are seasonable and appropriate to the locality.

We are just as anxious to see that cards are changed with the change in selling seasons as we are to make them attractive in design and printing.

By continually seeking to please the advertiser, we give him the kind of service that assures the railway company of a well established value for its car-card space.

Barron G. Collier
INCORPORATED

Candler Building
220 West 42nd Street, New York City

International Fare Registers



Type R-5
Double Register



Type R-10
Single Register

Visible and audible fare registration is a necessary element of every good fare system.

Many railway companies are readjusting fares to meet the increased cost of operation. To handle these changes in fares, without loss in collection, an effective system of checking passengers is needed. A Fare Register, operated by foot when the fare is received, and counting the number of fares, meets immediately any change in value of fare, without any change of fare collection system.

Paper tickets and transfers should be registered as well as cash, so that an accurate

check of all passengers entering the car can be made.

International Fare Registers have been and are today the standard equipment of the leading Electric Railways and city systems throughout the country. For almost a quarter of a century they have demonstrated themselves to be not only accurate in their construction, but so rugged in construction as to give enduring service.

International Registers are simple in construction, all parts are interchangeable, and the repairs are few and easy to make.

Exclusive Selling Agents for Heeren Enamel Badges.

The International Register Company

15 South Throop Street, Chicago

*Make it a pleasure for the
passengers to ride on your cars*



Consolidated Electric Heaters Make Warm Cars

On the cold winter day people do not like to walk along the street and very few can afford to hire a taxi to ride a short distance. The trolley car then is their next salvation. Should this car not be properly heated it is practically as bad as walking.

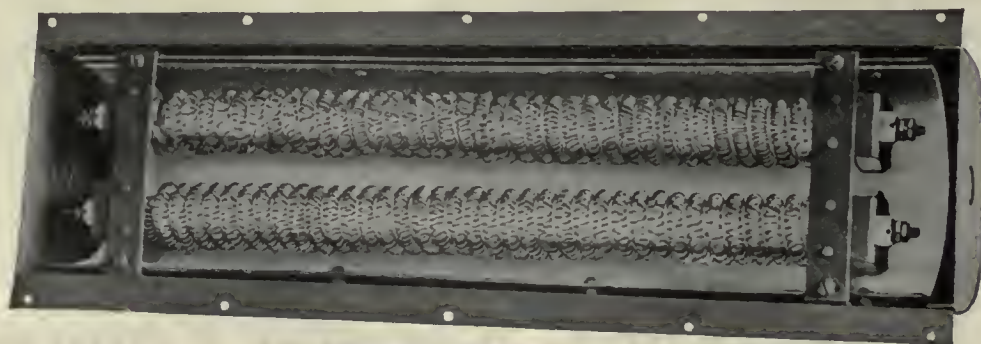
Well heated cars will not only make the public better satisfied but will increase the revenue of the Electric Railway. More people will want to ride and instead of a slim crowd you will have a large crowd.

Consolidated Car Heaters positively heat a car. They put the heat where it is most needed and where it is not unpleasant to the passenger.

With Consolidated Thermostatic Control constant temperature is obtained without attention.

Consolidated Heaters are easy to install, easy to repair and extremely low in maintenance.

Let us send you a complete descriptive catalogue.



CONSOLIDATED CAR-HEATING COMPANY
ALBANY NEW YORK CHICAGO



CONSTANTINOPLE
TURKEY

Or, let us be thankful that we can say now: "In Constantinople, a part of Turkey that was."

At no time, however, was this wonderful gateway of two continents anything more than a Turkish city in name. Actually, it is more cosmopolitan than New York.

When Constantinople got to the point of installing a street-railway system, the competition among the equipment manufacturers here and abroad was exceedingly brisk.

But in spite of the lure of cheapness, Hale & Kilburn seating was adopted as the standard of the Constantinople Tramways—just as it has been adopted wherever else careful consideration is given toward the selection of seating that is made to meet local peculiarities in dress and operating conditions without prejudice to durability and comfort.

Next time Hale and Kilburn Seats in Italy

Hale and Kilburn in Turkey

HALE and KILBURN
No. 108-AV Stationary Seat
For One-Man Safety Cars

This unmatched
H & K Seat beats the
world for strength and
lightness. Every Safety
Car should be equipped
with it.



There Is a Hale and Kilburn Seat
Made or Makeable
For Any Set of Conditions



Hale & Kilburn Corporation

Philadelphia
Washington

New York
San Francisco

Chicago
Atlanta

St. Louis
Dallas

Detroit
Louisville

LONDON—G. D. PETERS CO., LTD., 15 DEANS YARD, WESTMINSTER





Chicago Surface Lines Installs the UTILITY Compensating System of Natural Ventilation on Arch Roof Cars

The illustration above shows one of the company's nine new arch roofs equipped with the UTILITY Compensating System of Natural Ventilation, comprising Honeycomb Ventilators and the UTILITY Compensating Intake. The louvre of the intake is shown in the view at the right.

This type for arch roof cars is a modification from our standard compensating system for monitor deck cars with which together with our heater regulator, the Chicago Surface Lines has equipped some 2,300 cars. The Detroit United Railway also has adopted the UTILITY Compensating System as their latest standard.

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The Utility Thermometer Control of Electric Heaters will save your road fully 50 per cent of electric heating energy and very substantially cut down your coal or power bills. Our newest device is tamper proof, shock proof, substantially built, durable and guaranteed to maintain a temperature within a range of 1 degree.



Utility Thermometer Control of Electric Heaters

The operation of the intake illustrated herewith is as follows:

The air passes through the louvre over the center vestibule window into the intake, strikes a diffusing plate, passes over a movable vane which is susceptible to air pressure, under an adjustable regulating plate and into the car through a grille set in the upper portion of the end bulkhead. When the car is moving at high speed, the rush of air through the intake forces the movable vane backward, automatically reducing the size of the opening through which air may enter the interior of the car. A strong head wind while the car is standing will produce practically the same effect. When the car is standing or running at low speed, the size of the opening is normal.

Surplus air is carried off through ports in a vent plate which is located under the movable vane, thence through relief ducts which leave the main intake at right angles from which it is taken out of the car through round jet ventilators, set in the hood of the car. This prevents flapping of the movable vane.

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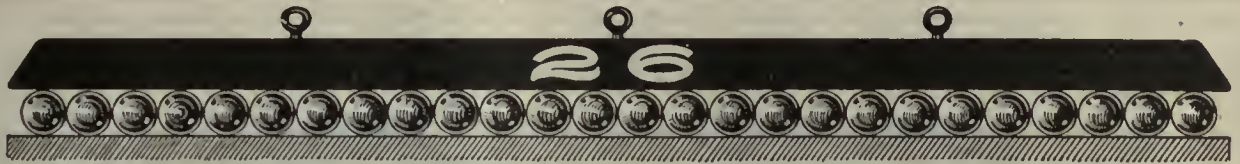
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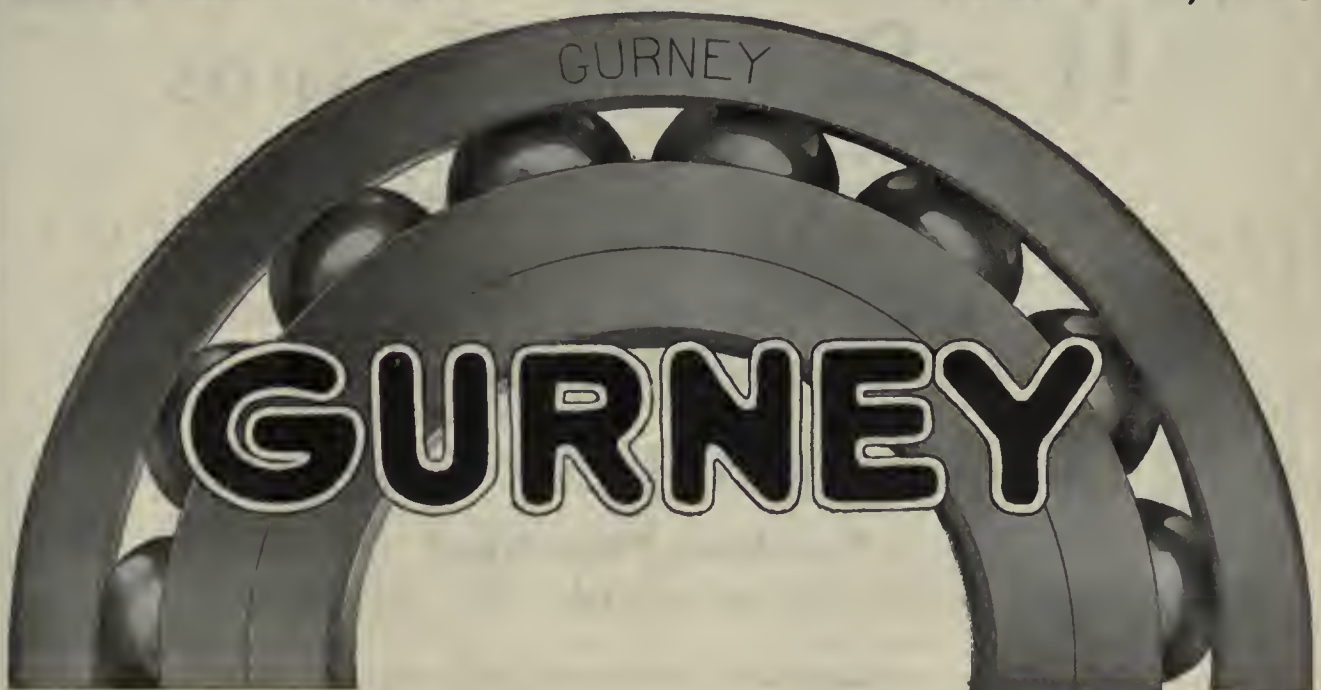
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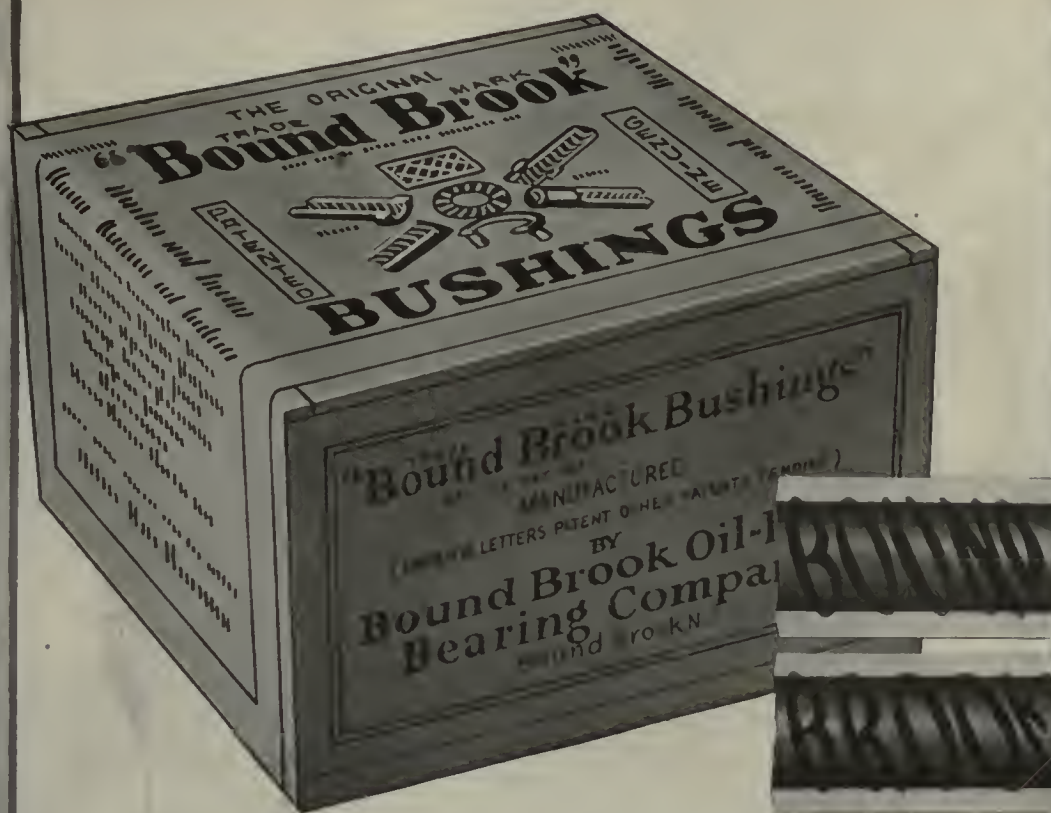
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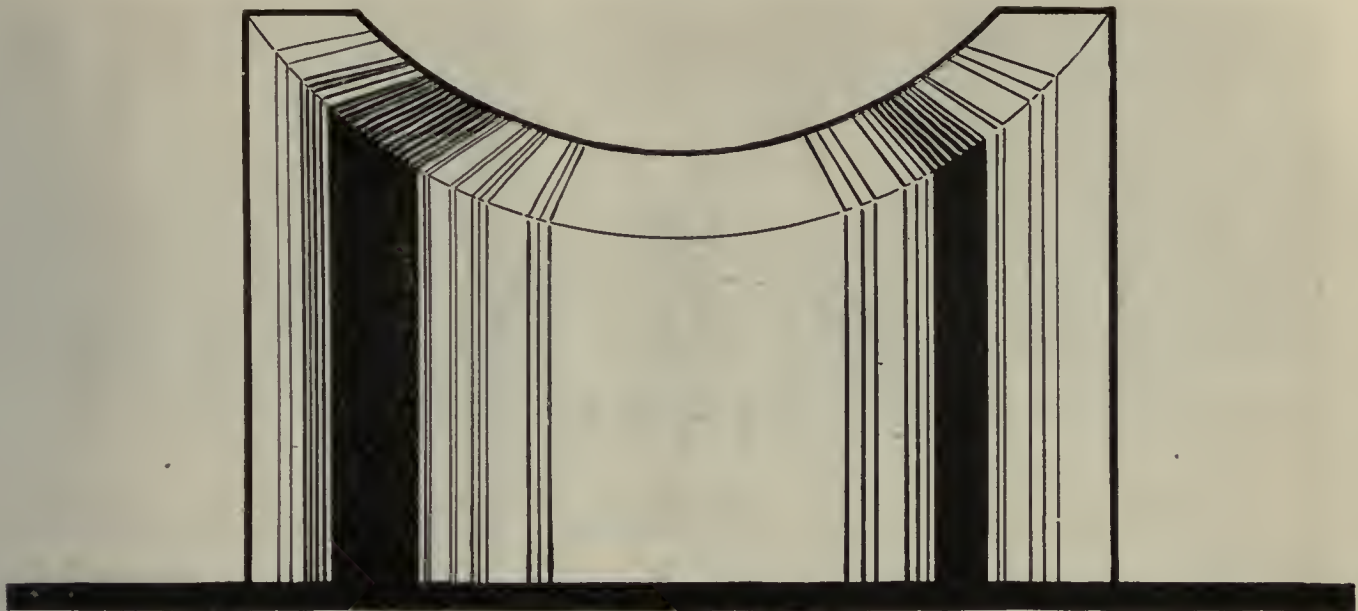


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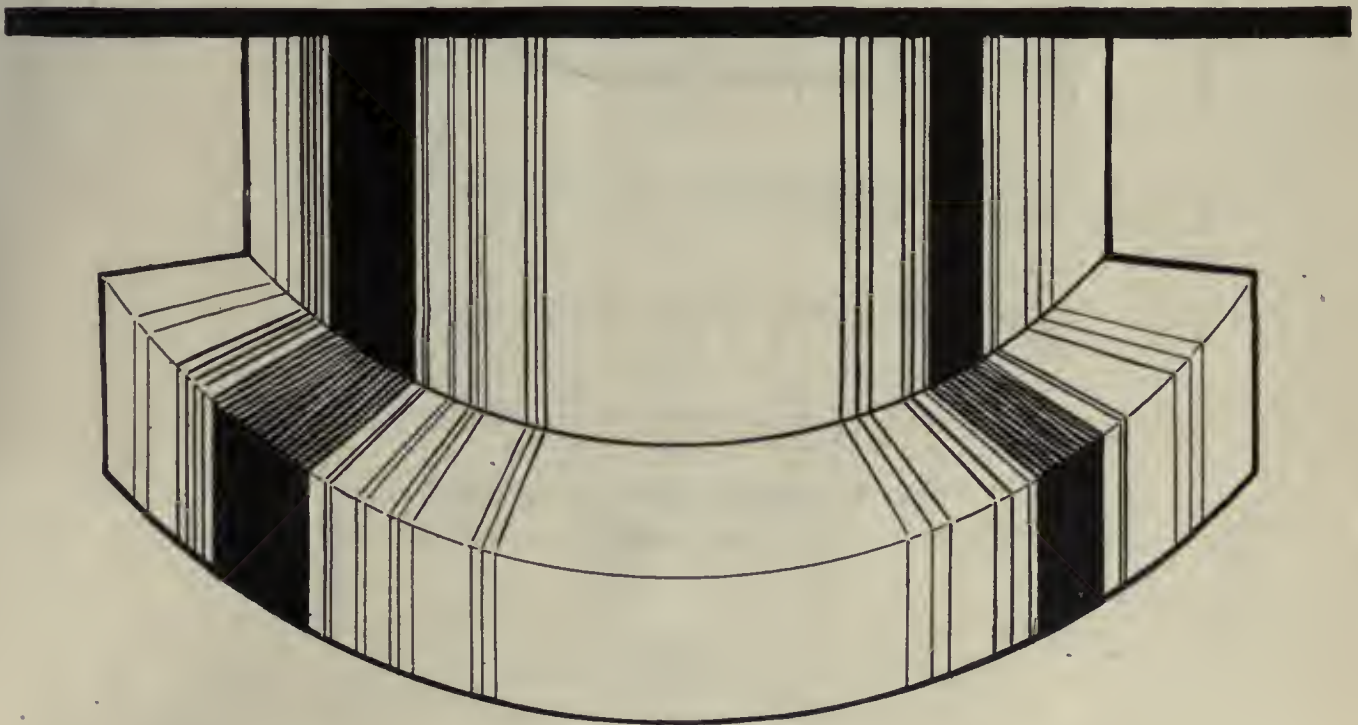
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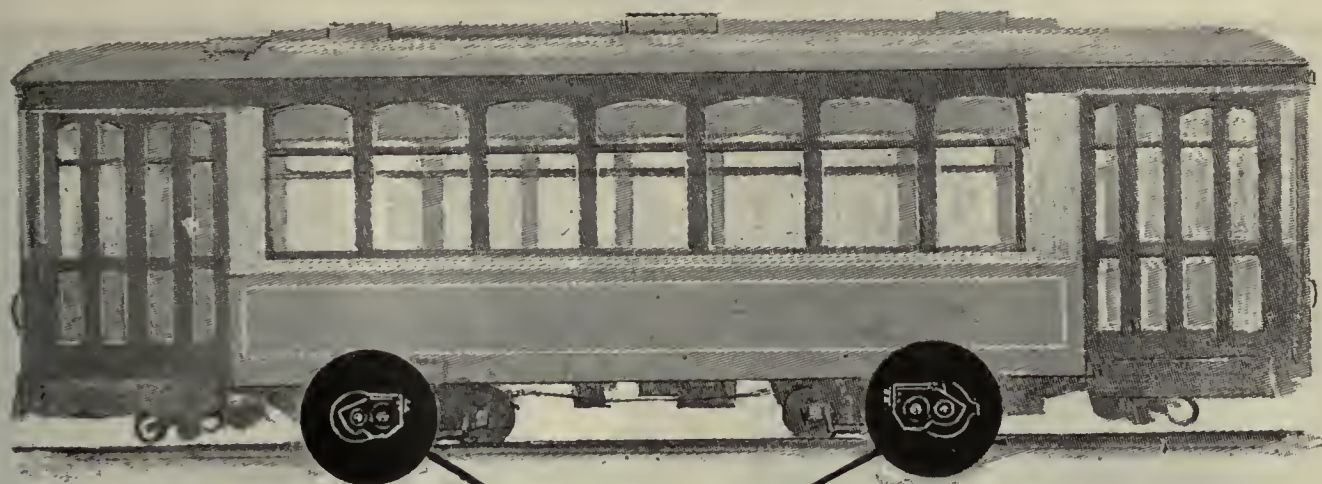
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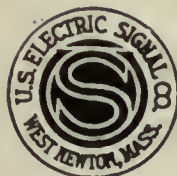
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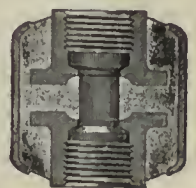
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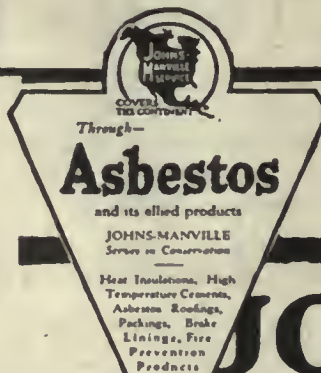
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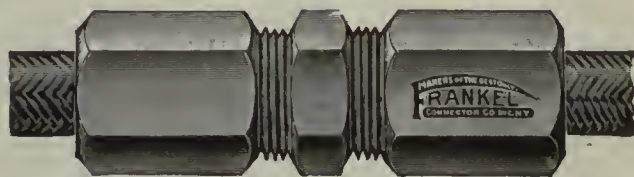


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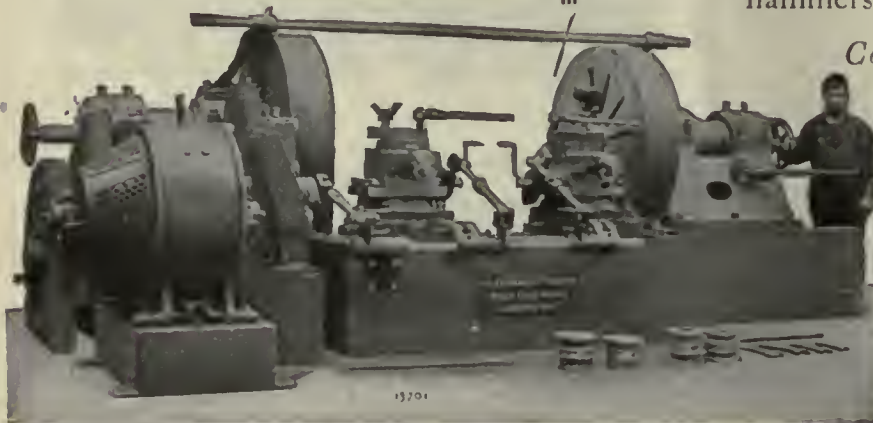
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have all the strength of steel poles combined with the permanence, rigidity and lack of maintenance expense which characterize reinforced concrete.

They are not subject to electrolysis or corrosion; will not require painting or become unsightly; and are readily adaptable to all forms of trolley supports.

The Massey special centrifugal process of manufacture insures a denser concrete than other processes may attain, and an absolute *certainty* of position of the reinforcement—while their hollow construction insures lightness and ease of handling.

Massey Concrete Products Corp'n
Peoples Gas Building, Chicago

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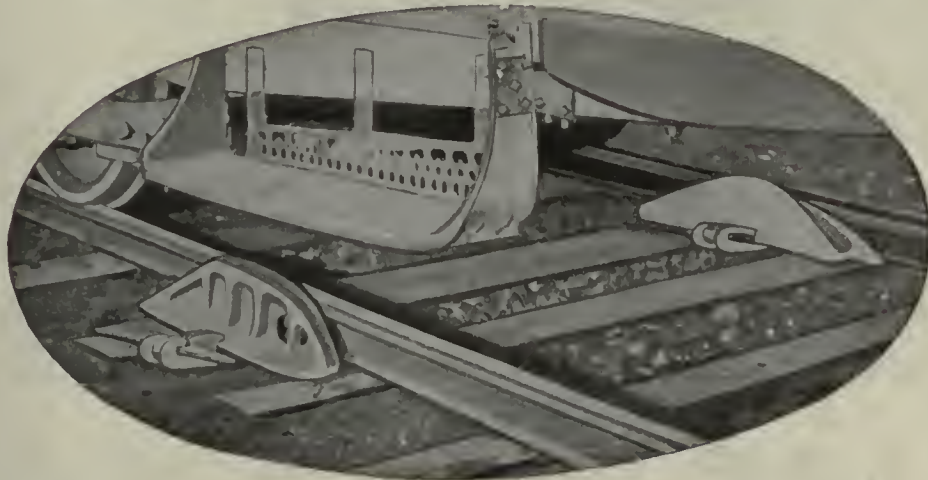
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READING

TYPE B REPLACER AND CLAMPS

FOR SUBURBAN TROLLEY SERVICE

NO SPIKING REQUIRED—CLAMPS HOLD REPLACER



Manufactured and Sold by
READING SPECIALTIES CO., READING, PA.
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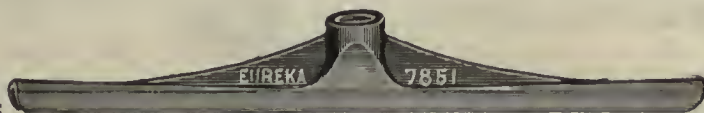


Eureka

Line equipment is made of our own metal alloys. No scrap is used for melting purposes. Correct design and careful manufacture are the things we take pride in.

COMMUTATORS, TROLLEY WHEELS, TROLLEY EARS, BRUSH HOLDERS,
 SLEET TROLLEY WHEELS, LINE MATERIAL, CONTROLLER FINGERS, BEARINGS.

MANUFACTURED BY
THE EUREKA COMPANY
 NORTH EAST, PENNSYLVANIA



STEAM TURBINES

STANDARD SIZES FROM 200 K. W. TO 12500 K. W.



10000 K. W. 1800 R. P. M.
STEAM TURBINE &
ALTERNATOR UNIT



ALLIS-CHALMERS

MILWAUKEE, WIS. U. S. A.

HYDRAULIC MACHINERY

will keep your rolling stock
moving

We Show Here *Just One* of Our Many Presses for Armature
Repairs and Numerous Operations of Pressing,
Forcing, Bending, Etc.

This press is a self-contained unit requiring no auxiliary water or power supply, driven like any lathe or machine tool. It can be arranged for belt drive if desired. The ram moves vertically upward, and above it is a resistance platen which is raised or lowered by the right- and left-hand screw to suit the various sizes of armatures.

The pump is double acting and is controlled by a stop and release valve with check which holds pressure on the ram as long as desired. We build many other handy hydraulic tools for the railway shop or for track maintenance, such as motor lifts, pit jacks, benders, shears, bonding presses, punches, rail benders, etc.

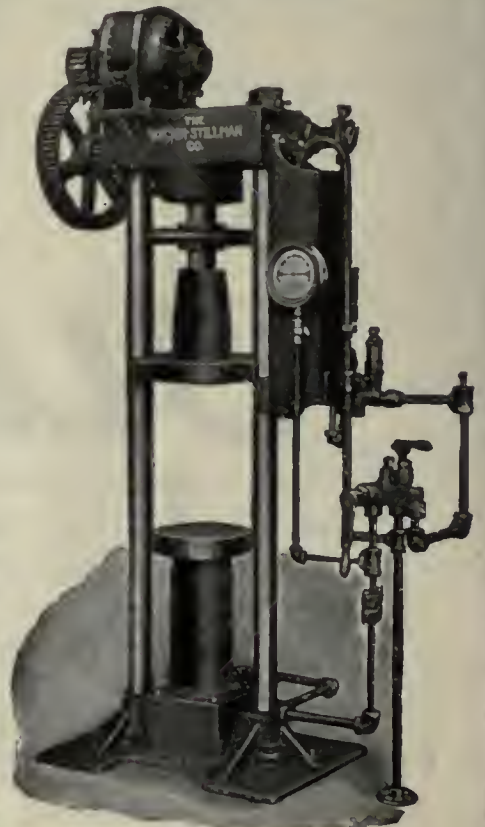
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THE WATSON-STILLMAN COMPANY
46 Church Street, New York

Chicago, McCormick Bldg.



342



50-Ton Armature Press.

DU PONT AMERICAN INDUSTRIES

DU PONT
FABRIKOID

SEATS THAT STAY NEW

The adverse service conditions imposed upon railway upholstery demand a material of the strongest texture—one that will wear well and can be kept like new. The durable and sanitary qualities of Fabrikoid especially adapt it to these requirements. Water-proof, stain-proof, dust-proof, and cleanable its original leather-like beauty can be retained with minimum care. It is making friends wherever used.

Write for samples.

DU PONT FABRIKOID COMPANY
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Railway Agents
WENDELL & MACDUFFIE CO.
61 Broadway, New York City.

DU PONT

TICKETS

You Can Get a Better Check on Fares

with paper tickets than with the more expensive metal tickets. Besides, they are easier to handle.

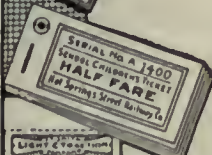
Our tickets embody accuracy, quality and service and the price is reasonable.

We will furnish a ticket exactly like your sample.

If you are anticipating a fare change let us consult with you on your ticket problem.

Quotations? Send the sample.

Weldon-Williams & Lick
FORT SMITH, ARK.



We Specialize So That You Shall Standardize on the

EARLL

Because we have devoted our years of experience to the manufacture of trolley Catchers and Retrievers exclusively—the only concern in America which has—we are able to produce the kind of catchers and retrievers that will satisfy your demands of service and maintenance.

Many roads all over the country have not used any other catcher or retriever since they installed the first EARLL on their cars.

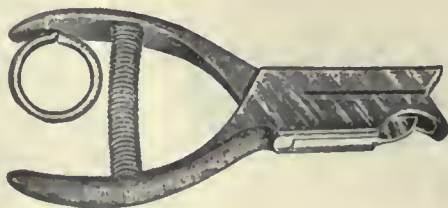
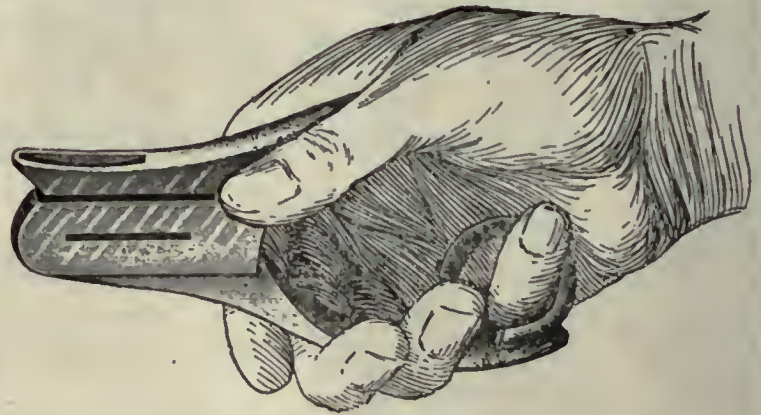
We will gladly send you samples to try out in actual service if you will describe your equipment, speed, trolley tension, etc. No cost—no obligations.

C. I. EARLL, YORK, PA.

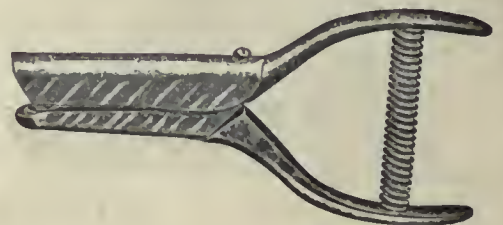


For Quality B-V Punches

The Dies Are Tool Steel
100 Varieties



**Bonney
Vehslage
Tool Co.**
Newark, N. J.



High Speed!



Harp or wheel changed in ten seconds, or a pole in less than a minute. No tools—only your hands. All lubricating, adjusting and repairing done at the work bench. No delays to car schedules. That is why

All large users of One-Man Cars use the Bayonet

It is not only a great time saver, but it is unsurpassed for efficiency and economy. Try it for 60 days. You must be satisfied or the equipment is ours. Get ready for heavy traffic.

BAYONET TROLLEY HARP COMPANY

Springfield, Ohio, U. S. A.

“Chillingworth” Brackets

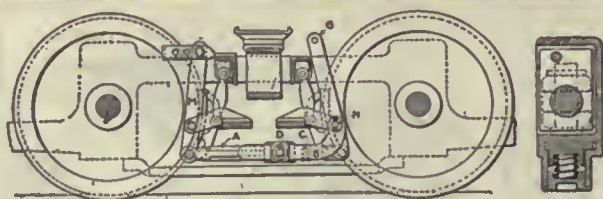


End Supported Seamless Steel Case

are made of Malleable Iron Castings specially designed and constructed to give accurate shape and desired thickness insuring proper fit and strength

THAYER & COMPANY, Inc.

111 Broadway, N. Y.



DETAILS OF THE GOULD TYPE SLACK ADJUSTER AS APPLIED TO AN ELECTRIC CAR TRUCK

Increased Brake Shoe Mileage Means Lower Car Maintenance

When the brake shoes are out of adjustment the whole car is under a heavy strain. Brakes that grip too quickly shock the car, while brakes that work too slowly sometimes require the use of emergency appliances to bring the cars to a halt. This also tends to weaken the car and cause parts to wear quickly.

The Gould Universal Automatic Slack Adjuster

does away with all this poor adjustment of the brake shoes. It automatically takes up all slack in the brakes and allows the shoes to give an evenly distributed pressure on the wheel. No attention is necessary because every time the brakes are applied the Slack Adjuster takes up the slack.

The result is that the racks and knocks that occur on a car in braking are reduced to a minimum. Brake shoes give a maximum mileage and car maintenance is decreased greatly. This allows your cars to get more mileage themselves because they are not in the shop for repairs as often. Gould Slack Adjusters will pay for themselves in a short while.

Write to us for full details.

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New York City

Works,
DEPEW, N. Y.

The Rookery,
CHICAGO, ILL

TRADE MARK
IRVING SAFSTEP
(PATENTED) REG. U.S. PAT. OFF.
ABSOLUTELY NON-SLIPPING ALWAYS



Safety, as assured by its absolutely non-slipping surface, is only one good feature of the Irving "Safstep." It will not accumulate dirt, and fill up. It is a clean step—which contributes to car cleanliness and good service. It is light, firm, never gets loose and rattley. And it is adapted to any style or type of car. Here is a genuine service improvement awaiting your adoption. Send for Catalog 2A28.

IRVING IRON WORKS CO.
LONG ISLAND CITY, N.Y., U.S.A.



A Big Time Saver!

Hensley Fool-Proof Trolley Harps

Much time is often lost by the conductor in trying to put the trolley wheel back on the wire due to the fact that the wire catches in the harp or along the side of the wheel.

This is not possible when the Hensley Fool-Proof harp is used because it is impossible for the wire to hit anywhere but in the correct slot in the trolley wheel.

The conductor can be sure that so long as the pole does not jump up on release the wheel is on the wire in its proper position.

Write for details.

Hensley Trolley & Mfg. Co., Detroit, Mich.

You'll find them nice people to do business with

Here
is the
fool-
proof-
feature



Agricultural Sections
Alloy Steels
Angles
Arch Bars
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Steel and Allied Products

Carnegie Steel Company manufactures a larger variety of steel sections than any other steel maker in the United States. Into their manufacture are put that technical skill and conscientious workmanship that has earned for this company its enviable reputation. It is with a cordial spirit of co-operation that your wants are regarded and you are invited to take advantage of Carnegie Service.

Special pamphlets have been prepared covering many of the products mentioned in this list, which will be gladly sent you on request to nearest district office.

Five conveniently located warehouses make steel sections in common use immediately available. Carnegie Warehouse Service will meet your needs quickly and efficiently. A monthly stock list is prepared and mailed to our customers.

The service of trained engineers is also at your disposal. No matter what your problem is, they will gladly assist you.

Carnegie Steel Company

General Offices: Carnegie Building, Pittsburgh, Pa.

District Offices: Birmingham, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Denver, Detroit, New Orleans, New York, Philadelphia, Pittsburgh, St. Louis, St. Paul.

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Rivet Rods
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Trough Plates
Twisted Squares
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Welding Steel
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Save Time—Money—Labor by

“Saving the Finger and Scrapping the Tip”

When your controllers are fitted with

TRIGGER-LOCK

Reversible Controller Fingers

they are fitted permanently. The finger never wears out and the tip, besides being reversible, gives twice as much wear on each side as the ordinary finger. When worn on both sides, simply snap on another tip without removing the finger from the controller. Cars are kept on the street, service maintained, and time, labor and money saved.

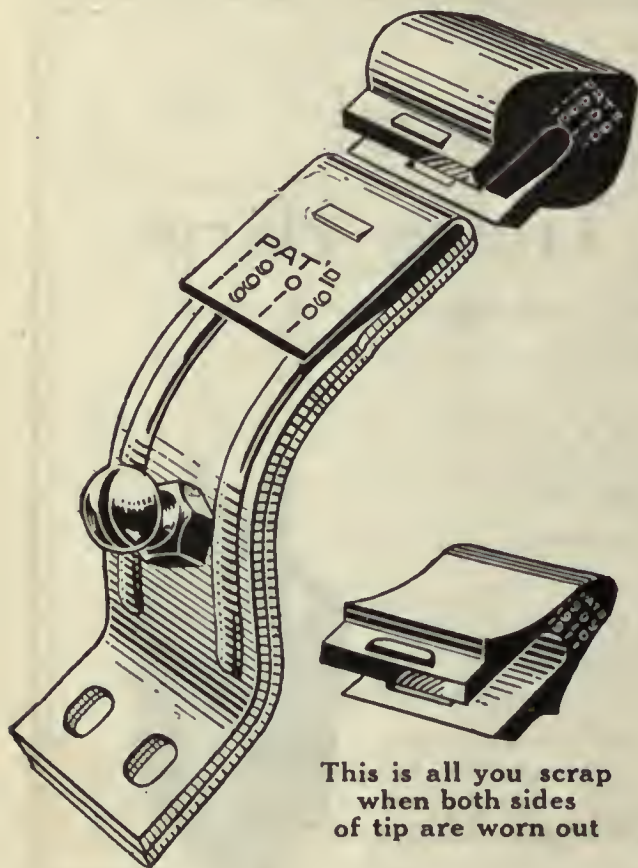
Standard on over 200 large roads.

Trigger-Lock Reversible Controller Finger

U. S. Factory: 814-18 Bath Ave., Niagara Falls, N. Y.

Canadian Factory: 557 King St., West, Toronto, Canada

CABLE ADDRESS “RICHRUSS”



This is all you scrap
when both sides
of tip are worn out

FMB Grid Resistors

ARE MADE RIGHT AND STAY RIGHT

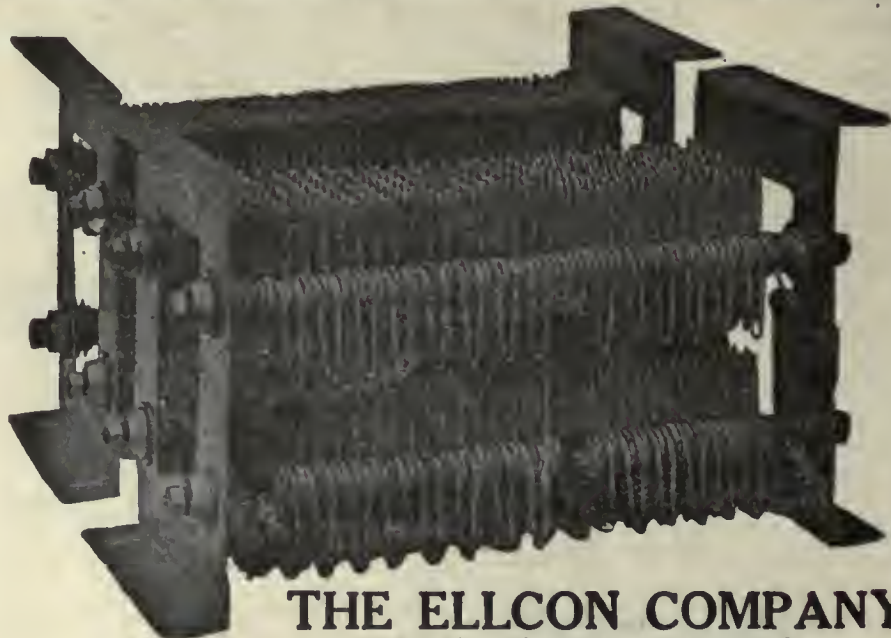
No resistors get more abuse than those under a car.

They are abused electrically by careless operation of the controller.

They are abused mechanically by exposure to dusty, muddy and stone-littered streets.

Until the arrival of E M B drawn, non-corroding grid resistors, troubles from these sources seemed unavoidable.

E M B grid resistors actually have made this part of your equipment troubleproof.



THE ELLCON COMPANY
50 Church Street, New York



QUIET HELICAL GEARING

Their quietness is the point that makes them particularly valuable for freight haulage at night.

BP heat treated Helical Gears are everything that spur railway gears, are plus quietness of operation and a great increase in efficiency.

That looks good doesn't it?

R. D. NUTTALL CO.
PITTSBURGH,
PA.



Nuttall Gears

EVERY GEAR REGISTERED



*Take off one car—and still get the
same car mileage!—*

with.



ROLLWAY BEARINGS

A railway compared two 26-ton, four-motor cars, one with plain bearings and one with Rollway Bearings, over a 12.7 mile line with the same motorman and under the same physical conditions.

The Rollway Bearings car not only used 10.15 per cent less energy, but it made the run in 55 instead of 61 minutes.

This saving of 9 per cent in running time is almost the equivalent of 9 cars for 10 for the same car mileage!

The Railway Roller Bearing Co.

Syracuse, N. Y.



The Cost of GRIFFIN F. C. S. WHEELS

is of secondary consideration when taking into account their guarantee and scrap value.



Every detail of manufacture is given the most careful attention. They are scientifically designed so that each part is correctly adapted for its particular function.

The chilled tread surface contains three and one-half per cent. carbon white iron—is harder than tool steel, and capable of long wear.

Griffin service will assist you in selecting the proper size and weight for your cars.

GRIFFIN WHEEL COMPANY

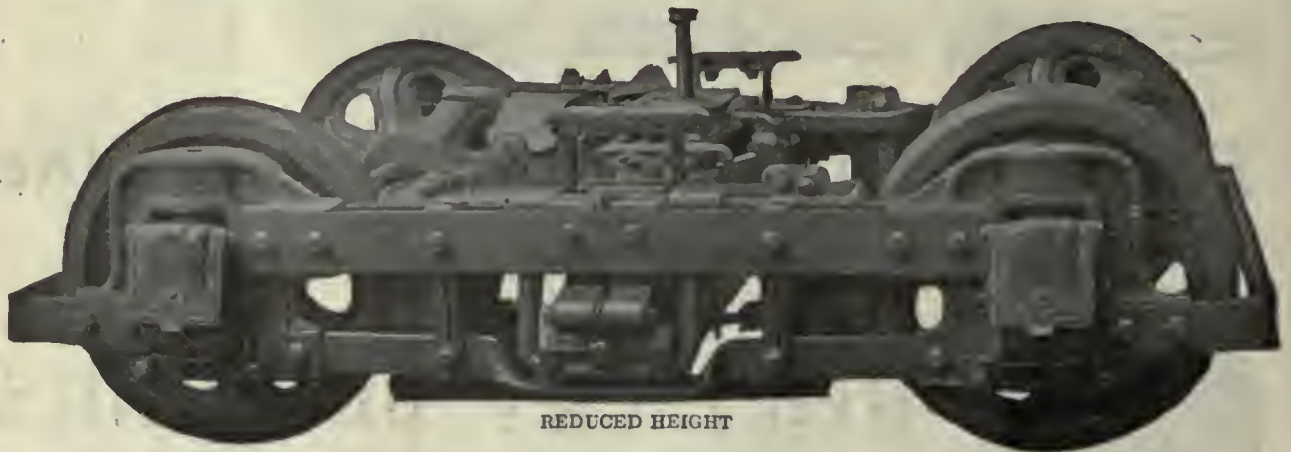
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R. H.

TAYLOR REDUCED HEIGHT TRUCK



REDUCED HEIGHT

TAYLOR R. H. TRUCK

Mounted on 26-in. Wheels with Springs Over Journal Boxes.
Designed to Mount Centre and End Entrance Cars Low Down.

SWING MOTION AND FULL ELLIPTIC SPRINGS

Wheel Base 5 ft. 2 in. For Car
Bodies weighing 16,000 to 22,000 lb.
Motors Inside Hung.

**EASY
RIDING**

Journals $3\frac{3}{4}$ x 7 M. C. B. Type.
Height from Rail to Body Bolster,
 $22\frac{3}{4}$ in. Brakes Inside Hung.

TAYLOR ELECTRIC TRUCK CO., TROY, N.Y.

SPECIFICATIONS ON REQUEST

Established 1892

SEND FOR PORTFOLIO

Aluminum Company of America

Manufacturers of

ALUMINUM

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STEEL POLES FOR EVERY POLE PURPOSE



Cut shows Bates Steel Poles in use by the Royal Swedish States Rys., electrifying the steam railroad of Sweden, Lapland, located about 75 miles south of the Arctic Circle, in the land of the Midnight Sun, the most northerly railroad of the world.

Bates Steel Poles are becoming universally popular world wide. Repeat orders testify their general suitability for every Pole purpose.

Telegraph, Telephone, Power Transmission, Electric Trolley Lines, Electric Lighting, Etc.

Highest class and most up-to-date steel pole equipment in the world.

Our STEEL POLE TREATISE tells the story. Ask for it.

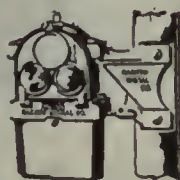
About 2,000 tons of steel constantly on hand; hence prompt shipments.

Tubular Steel Poles cost 50 per cent. more than Bates Steel Poles, yet Bates Poles are 100 per cent. stronger—will last 100 per cent. longer, cover a much broader range of adaptability and are much more artistic than Tubular Poles. Ask us to verify these facts.

BATES EXPANDED STEEL TRUSS COMPANY

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Chicago, Ill., U. S. A.



NACHOD SIGNALS

on that piece of single track that's been worrying you will show when the block is clear, tell the motorman when he has set the stop signal at the other end, show to following cars that the block is occupied, and give each an indication that it is protected in entering; meanwhile holding stop signals against opposing movements until the block is clear again.

Nachod signals save time, they never sleep, and are ever on the alert to prevent accidents.

Nachod Spells Safety
in signals, bells and headway recorders

NACHOD SIGNAL CO., Inc.
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AN INVESTMENT



When you put your money into KERITE you make an investment in service. You do more than buy conductors, insulation and protection. You obtain the best possible combination of the most desirable qualities in permanent form. KERITE remains long after the price is forgotten.

**KERITE INSULATED
WIRE & CABLE COMPANY**
NEW YORK CHICAGO



DO YOU WANT

Light, Economical, Non - Corrodible
Stair-Nosing delivered from stock? If
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our

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THE BRITISH ALUMINIUM CO., LTD.,

OF LONDON, ENGLAND

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**WEATHERPROOF WIRE
AND CABLE**
**PAPER INSULATED
UNDERGROUND CABLE**
(Single, Duplex and Three Phase)
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**BARE COPPER WIRES
AND CABLES**
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Phillipsdale, R. I.

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Western "Good Poles Quick" Northern

Quick Shipments from our Rooms 832-834, 72 West Adams St. Butt Treating
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Yard Spokane — St. Louis "Hot and Cold"
Processes



For every type of
modern service.

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Quick Service Yard & Butt Treating Plant
in Minneapolis

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UPPER MICHIGAN WHITE CEDAR

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"NATIONAL"

TUBULAR STEEL POLES

Ask for "NATIONAL" Bulletin No. 15, "NATIONAL" Tubular Steel Poles
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Automatic Signals
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Automatic Safety and Automatic Return Switch Stands for Passing
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HILLBURN, NEW YORK
Plants at Hillburn, N.Y. and Niagara Falls, N.Y. New York Office, 30 Church Street

**Peirce Forged Steel Pins
with Drawn Sheet Steel Thimbles**

Your best insurance against insulator breakage

Hubbard & Company

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Don't Take Chances!

The Name
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on Safety Straps
and Belts means
that they are **SAFE!**

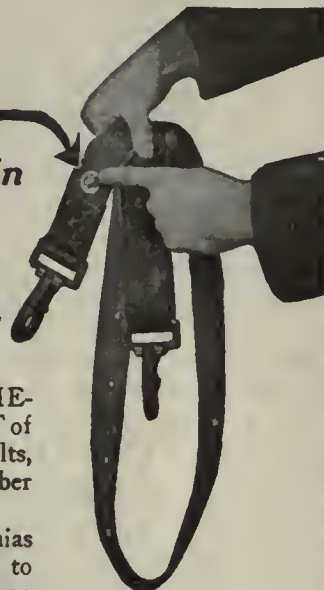
(Look for the name)

We can make IMMEDIATE SHIPMENT of leather goods — belts, safety straps, climber straps, tool bags, etc.

The name, Mathias Klein & Sons, coupled to leather goods for linemen and electricians means the same assurance of quality and trustworthiness as it does in connection with tools.

Don't Forget—Our Complete Illustrated Catalog Awaits Your Request.

Mathias Klein & Sons, Tool Mfrs.
Canal Station 25, Chicago



TRUCK WITH TOWER IN RUNNING POSITION

This 3-Section TRENTON TOWER

is not only more convenient, but stronger than the older type.

The top section is reinforced by the intermediate section. The 3-section design makes it possible to raise the platform 16 inches higher and drop it 12 inches lower than can be done with the old-style 2-section tower.

We'll gladly send you details.

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Trenton, New Jersey, U. S. A.



Drip Points for Added Efficiency

They prevent creeping moisture and quickly drain the petticoat in wet weather, keeping the inner area dry.

The Above Insulator.—No. 72—Voltages—Test—Dry 04,000, Wet 31,400, Line 10,000.

Our engineers are always ready to help you on your glass insulator problem. Write for catalog.

Hemingray Glass Company
Muncie, Ind.
Est. 1848—Inc. 1870

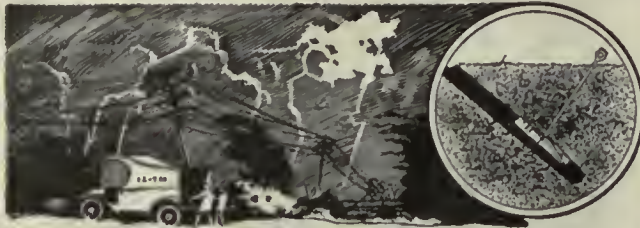


MANHOLE JUNCTION BOX FOR UNDERGROUND FEEDER CIRCUIT

The installation, operation and maintenance of underground cable systems is greatly simplified by the use of suitable junction boxes. The illustration shows a specially designed box for trolley feeder service which makes possible the disconnecting and sectionalizing of the different parts of the circuit while alive by simply opening one or more quick-break knife switches. This box is easily and quickly connected with the cable by wiped joints. It is perfectly waterproof when installed.

Standard Underground Cable Co.
Pittsburgh, Pa.

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New York San Francisco St. Louis
For Canada: Standard Underground Cable Co. of
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THAT EVERLASTING "OUT-GO"

NEVER-CREEP ANCHORS

Reduce Repair Expense

Here's an anchor that only an earthquake can move. It gets its strength and holding power by being bolted through solid ground—not disturbed earth as in the case of ordinary anchors and the old-fashioned "Dead Man."

The NEVER-CREEP doesn't depend on tamping, expanding, nor screwing—it's got the whole earth to pull against and cannot climb, creep nor change its original position.

The NEVER-CREEP anchor offers a means of a big saving in repair departments—and has been enthusiastically endorsed and adopted by the greatest men in your profession as the one and only logical, truly reliable solution to the age-old anchor problem.

ASK YOUR JOBBER

CHANCE COMPANY

Dept. J

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A Great Combination



No. 1. Flat Wire, to sweep crossings.

No. 2. Split Bamboo, to handle light dirt and snow in the frogs, switches and curves.

No. 3. Flat Wire, to remove ice, slush and mud from the same places and a chisel point on the end of the handle to loosen the ice and crust.

None superior are produced for purposes intended. No. 1 supplied with or without handles, and No. 2 and 3 have a chisel on the end of handle to cut the crust and ice, but are supplied without chisel if desired.

Write for prices.

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**Design and
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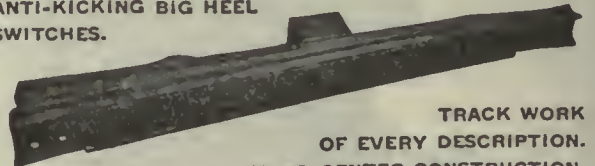
*Standard Insulated
and Compromise
Rail Joints*

The Rail Joint Company
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SPECIAL TRACK WORK

SWITCHES, FROGS AND CROSSINGS.

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SWITCHES.



TRACK WORK
OF EVERY DESCRIPTION.
HARD CENTER CONSTRUCTION.
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MILBURN
COMPANY-BALTIMORE, MD**

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WATER

PURIFICATION SYSTEMS,
SOFTENING & FILTRATION
FOR BOILER FEED AND
ALL INDUSTRIAL USES

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Reduce Insulator Costs
Standardize On



"The Five Leaders are"

MICANITE

Empire—Linotape—Kablak—Mico

because they are universally used by all railway motor manufacturers and all large street railway repair shops.

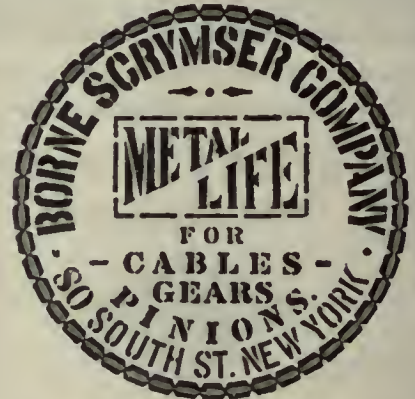
If you are not already using some or all of them let us submit samples and descriptive matter on our insulation specialties.

MICA INSULATOR CO.

Manufacturers

68 Church Street, New York 542 So. Dearborn St., Chicago
Works: Schenectady, N. Y.

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POWER
GEARS
OF
ROLLING STOCK
PROTECTED WITH**



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Greatly Increase Efficiency and Power of Steam Turbines

POWER SPECIALTY CO., Trinity Building, 111 Broadway, New York

HOPE Brand *for best results*

Webbings and Tapes made from the best raw materials—made with the most up-to-date machinery and most reasonably priced! That's what you get in Hope Products.

Send for Samples.



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Providence, R. I.

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"American"
INSULATING
MACHINERY
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REG. U.S. PAT. OFF.
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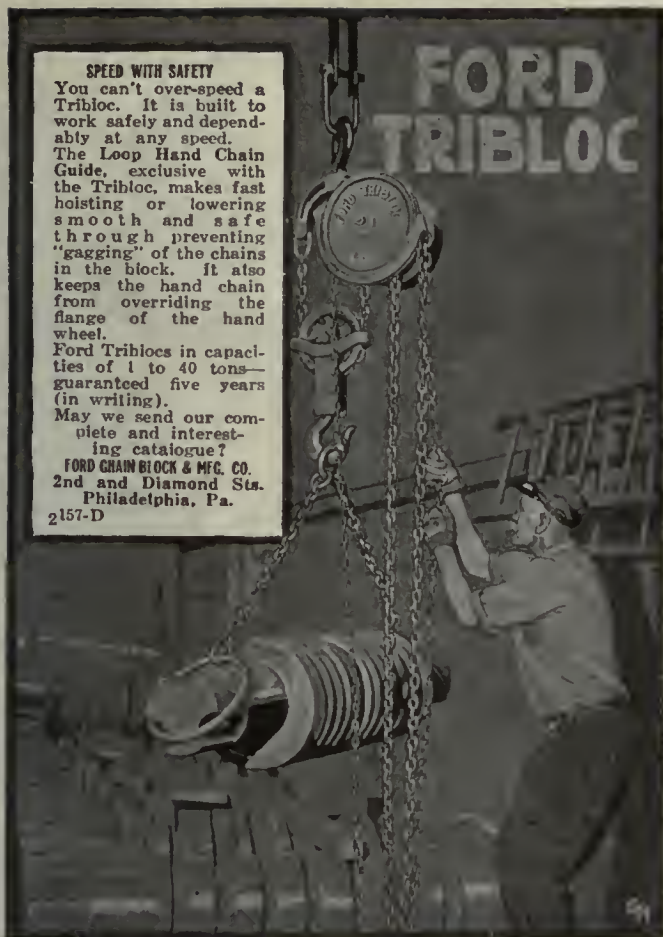
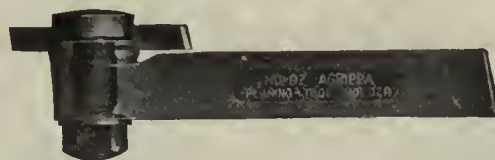
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- 4—ECONOMY—They save more time value than the holes cost.
- 5—You get them for nothing and are paid for using them when you count time saved.
- 6—Screw holes have been needed ever since the first screw was used.
- 7—Special tools are NOT needed in using them in any material.
- 8—They can be used in any place a screw can be used.
- 9—By using screw holes, screws can be used in many places, and in many materials. Where it is impossible to use screws without them.
- 10—These are the only ready-made screw holes in the world.
- 11—No special screws are needed. These screw holes in any wood screw or machine screw now in stock.
- 12—They make the next best possible job in any material.
- 13—Every store where screws are sold must carry them in stock, because the line of screws is not complete without screw holes for them.
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- 16—Screw holes are entirely new and the world supply is yet to be furnished.
- 17—This is a progressive Old World of ours, and every active person in it must adopt all improved methods, and all new articles that will help him keep in the front line of progress.
- 18—Be among the first to stock up in screw holes if you are a dealer in screws.
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- 27—Send for a sample and convince yourself.
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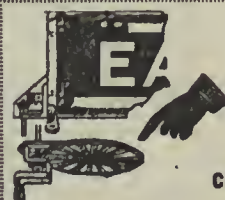
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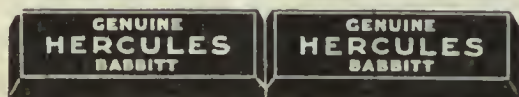
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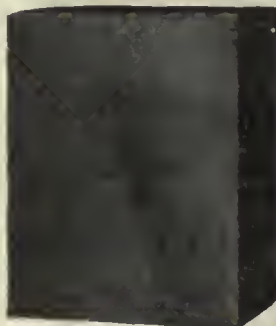
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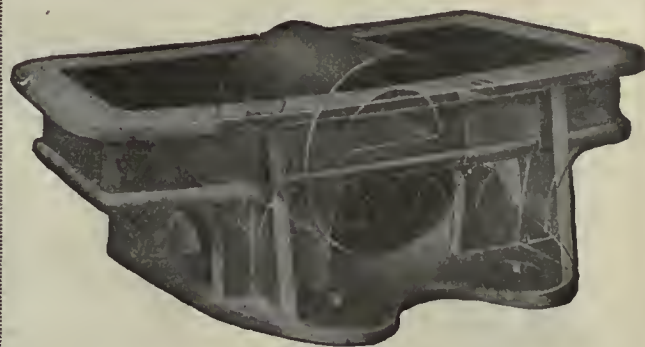
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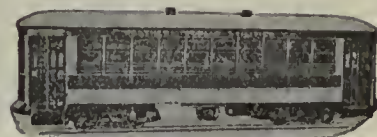


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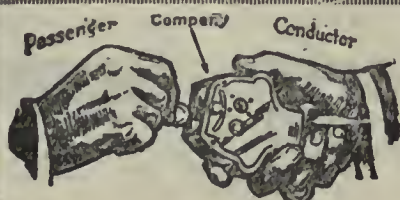


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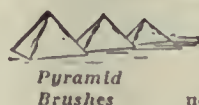
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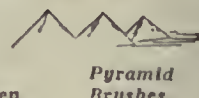
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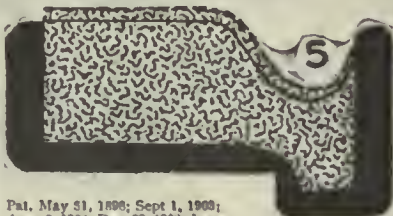
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Trucks—Brill #27G-1; axles 4½"; journals 3¼" MCB; wheel base 4' 6"; wheels 33"; tread 3"; flange ¾"; gauge 4' 8½".

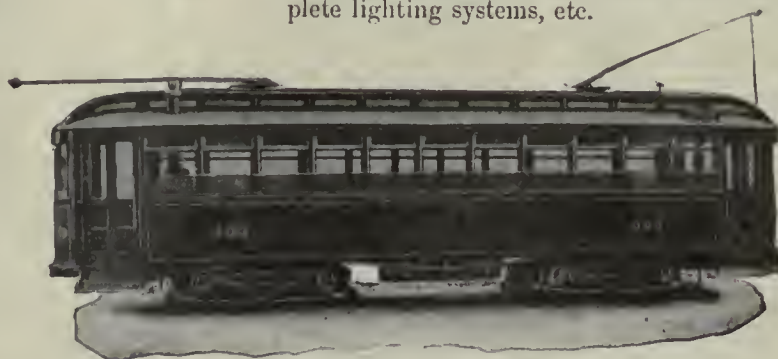
Motors—Four Westinghouse #101-B, gear ratio 69:15.

Controllers—Two Westinghouse #K-28-B.

General Equipment—Westinghouse straight air brakes, compressor tanks, International cash registers, hot air heaters, sanders, complete lighting systems, etc.

Five Double-Truck Interurban Cars

Standard Gauge



General Dimensions—

Length overall	40' 10"
Length over body	30' 10"
Extreme width	8' 1"
Height, rail to trolley base	12' 8"
Truck centers	18' 6"

Seating—14 cross reversible and 4 longitudinal seats, rattan.

Total Seating Capacity—44.

Trucks—Built by American Car & Foundry Co.; axles 4½"; journals 3¼" MCB; wheel base 4' 6"; wheels 33"; tread 3"; flange ¾"; gauge 4' 8½".

Motors—Four Westinghouse #101-B, gear ratio 69:15.

Controllers—Two Westinghouse #K-28-B.

General Equipment—Westinghouse straight air brakes, compressor tanks, International cash registers, hot air heaters, sanders, complete lighting systems, etc.

The quality and condition of these cars justify us in recommending them as exceptional values. Write us for prices and further information wanted.

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Pittsburgh, 498 Union Arcade Bldg.

114 Liberty Street, New York
Montreal, Can., 285 Beaver Hall Hill

ELECTRICAL

STEAM



HYDRAULIC

GAS

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with
Names of Manufacturers and Distributors Advertising in this Issue

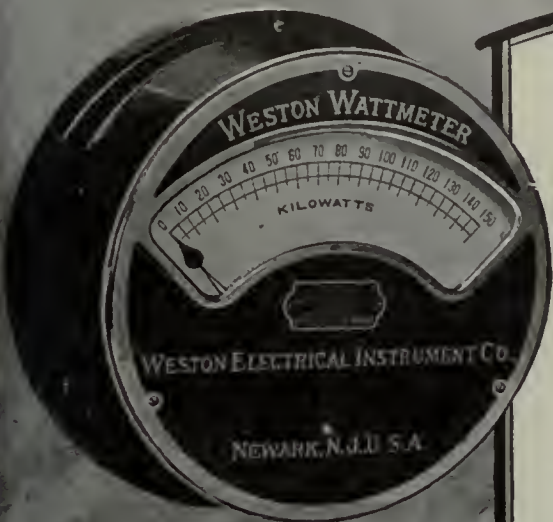
Acetylene Service & Apparatus
Oxweld Acetylene Co.
Advertising, Street Car
Collier, Inc., Barron G.
Air Rectifiers
Holden & White, Inc.
Aluminum Products
Br. Aluminium Co. Ltd.
Anemometers
Weston Elec'l Instrument Co.
Anchors, Guy
Electric Service Supplies Co.
Chance Co., The
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Ohio Brass Co.
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Railway Improvement Co.
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Axles
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Carnegie Steel Co.
Midvale Steel & Ordnance Co.
National Railway Appliance Co.
St. Louis Car Co.
Standard Steel Works Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.
Babbitt Metal
Ajax Metal Co.
Babbling Devices
Columbia M. W. & M. I. Co.
Badges and Buttons
American Railway Supply Co.
Electric Service Supplies Co.
International Register Co., The
Bankers and Brokers
Coal & Iron National Bank.
Batteries, Storage
Electric Storage Battery Co.
Johns-Manville Co., H. W.
Bearings and Bearing Metals
Ajax Metal Co.
Bemis Car Truck Co.
Brady Brass Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
More-Jones Brass & M. Co.
Post & Co., Inc., E. L.
St. Louis Car Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.
Bearings, Center and Roller Side
Holden & White, Inc.
Stuckl Co., A.
Bearings, Oil-less, Graphite, Bronze and Wood
Bound Brook Oil-less Bearing Co.
Bearings, Roller & Ball
Gurney Ball Bearing Co.
Railway Roller Bearing Co.
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Electric Service Supplies Co.
Ohio Brass Co.
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General Electric Co.
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Lincoln Bonding Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

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Niles-Bement-Pond Co.
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(See also Poles, Ties, Posts, Piling and Lumber.)
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Lindsley Bros. Co.
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Gould Coupler Co.
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Brill Co., The J. G.
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Taylor Electric Truck Co.
Wheel Truing Brake Shoe Co.
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Brill Co., The J. G.
Columbia M. W. & M. I. Co.
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National Brake Co.
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Safety Car Devices Co.
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Reading Specialties Co.
Bridges and Buildings
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Zelnicker Supply Company, Inc., Walter A.
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General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
National Carbon Co.
United States Graphite Co.
Westinghouse Elec. & M. Co.
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United States Graphite Co.
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Eureka Co.
Flower, D. B.
Bunkers, Coal
American Bridge Co.
Bushings, Case-Hardened Manganese
Bemis Car Truck Co.
Bushings, Graphite and Wooden
Bound Brook Oil-less Bearing Co.
Bushings, Trolley Wheel
Ives Co., The H. B.
Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc., see those Headings.)
Car Trimmings. (For Curtains, Doors, Seats, etc., see those Headings.)
Cars, Dump
Differential Car Co.
Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cambria Steel Co.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
Midvale Steel & Ordnance Co.
St. Louis Car Co.
Thomas, Perley A.
Wason Mfg. Co.
Cars, Second Hand
Electric Equipment Co.
Cars, Self-Propelled
Br. Westinghouse Elec. & Mfg. Co.
Electric Storage Battery Co.
General Electric Co.
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Eureka Co.

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American Bridge Co.
American Steel Foundries
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Columbia M. W. & M. I. Co.
St. Louis Car Co.
Standard Steel Works Co.
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American Brake S. & Fdy. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
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Earl, Chas. I.
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Ohio Brass Co.
Wood Co., C. N.
Celling Car
Keyes Products Co.
Pantasote Co.
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McGill Ticket Punch Co.
Checking
Industrial Protective Co.
Checks, Employees
American Railway Supply Co.
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Cutler Co., The
General Electric Co.
Westinghouse Elec. & M. Co.
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Anderson Mfg. Co., A. & J. M.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Eureka Co., The
General Electric Co.
Hubbard & Co.
Klein & Sons, Mathias
Ohio Brass Co.
Westinghouse Elec. & M. Co.
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Ohio Brass Co.
Clusters & Sockets
General Electric Co.
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Coil Handling and Winding Machines
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D & W Fuse Co.
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King-Coil Mfg. Co.
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Colls, Choke & Kicking
Electric Service Supplies Co.
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Electric Service Supplies Co.
International Register Co.
Johnson Fare Box Co.
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Westinghouse Elec. & M. Co.
Wood Co., C. N.
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General Electric Co.
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Eureka Co.
General Electric Co.
King-Coil Mfg. Co.
Mica Insulator Co.
Westinghouse Elec. & M. Co.
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General Electric Co.
Westinghouse Traction Brake Co.
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Massey Concrete Products Co.
Condensers
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

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Tubular Woven Fabric Co.
Conduits, Underground
Standard Underground Cable Co.
Connectors, Solderless
Westinghouse Elec. & Mfg. Co.
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Thompson-Starrett Co.
Controller Fingers
Eureka Co., The
Controller Regulators
Electric Service Supplies Co.
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Eureka Co., The
General Electric Co.
Triggerlock Reversible Controller Finger
Westinghouse Elec. & M. Co.
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General Electric Co.
Westinghouse Elec. & M. Co.
Converters, Rotary
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.
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Green Eng. Co.
Conveying and Hoisting Machinery
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Green Eng'g Co.
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International Register Co., The
Roeblog's Sons Co., John A.
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Cord Connectors and Couplers
Electric Service Supplies Co.
Samson Cordage Works
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Couplers, Car
Brill Co., The J. G.
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Cleveland Frog & Crossing Co.
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Electric Service Supplies Co.
Detective Service
Wish Service P. Edward
Dogs, Lathe
Williams & Co., J. H.
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Consolidated Car Heating Co.
National Pneumatic Co., Inc.
Safety Car Devices Co.
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Johns-Manville Co., H. W.

On Guard!



Where Extreme Reliability is Essential

The development of the electrification of railroads has been made possible by the perfection of the art of electrical measurement. This Company originated the art as it is known and practiced today, and practically every improvement has emanated from this source. That is why

Weston

Alternating Current Switchboard Instruments

are on guard over so many electric railway power plants, insuring the most efficient control and usage of the electrical machinery and the most accurate supervision of power distribution.

Model 167 Wattmeter, one of the remarkable group of Switchboard Instruments supplied by this Company, is herewith illustrated.

*Write us for catalogs or bulletins,
specifying the field that interests you.*

Weston Electrical Instrument Co.

21 Weston Ave., Newark, N. J.



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National Pneumatic Co., Inc.
Draft Rigging. (See
Couplers, Car.)

Drills, Track

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Chicago Pneumatic Tool Co.
Electric Service Supplies Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

Dryers, Sand

Electric Service Supplies Co.
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W. A.

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Roebbing's Sons Co., J. A.

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tracting and Operating

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Arnold Co., The
Beeler, John A.
Byllesby, Inc., H. M.
Clark Co., Management Corp.,
E. W.

Drum & Co., A. L.

Feustel, Robert M.

Ford, Bacon & Davis

Holst, Engelhardt W.

Kelly, Cooke & Co.

Republic Engineers Inc.

Klebe, Albert S.

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Sanderson & Porter

Sargent & Lundy

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Stone & Webster

Wells, Gardner F.

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Woodmansee & Davidson Engi-

neering Co.

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Engines, Steam

Allis-Chalmers Mfg. Co.

Westinghouse Elec. & M. Co.

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Cleveland Fare Box Co.

Johnson Fare Box Co.

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Obmer Fare Regulator Co.

Fences, Woven Wire and

Fence Posts

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Fenders and Wheel Guards

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Cleveland Fare Box Co.

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Star Brass Works

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Fibre and Fibre Tubing

Westinghouse Elec. & M. Co.

Field Colls. (See Colls.)**Filters, Water**

Seale & Sons, Wm. B.

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Co.

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Harps, Trolley

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Smith Heater Co., Peter

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Material.)

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Electric Service Supplies Co.

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Macallen Co.

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Westinghouse Elec. & M. Co.

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Hubbard & Co.

Jacks. (See also Cranes,

Hoists and Lifts.)

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Junetion Boxes

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cent

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Milburn Co., The Alex

Lightning Protection

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Westinghouse Elec. & M. Co.

Line Material. (See also

Brackets, Insulators,

Wires, etc.)

Anderson M. Co., A. & J. M.

Archbold-Brady Co.

</

Of especial interest to street railway men

is the equipment whose uses are pictured. It is called the *Imperial Tie Tamping Outfit* and consists of two or four tamping tools, and a compressor car driven by either gasoline or electric motor. The former is self-propelling.

The Imperial has made a proud record in tamping ballast, doing far better and more lasting work than is possible by hand, and with a great saving in labor. But that is not its only use; let us see.

- 1.—The Compressor Car slid off the track to one side on its auxiliary wheels.
- 2.—Tamping tools fitted with bull points and being used to break up concrete pavement in Cuba.
- 3.—The same use in New York.
- 4.—Tamping at a crossing; here, as around switch-points and other places where a pick cannot be used, the Tie Tamper works efficiently.
- 5.—Tamper fitted with chisel cutting asphalt pavement.
- 6.—Tamping ballast on an electric interurban road. This shows the method of using tampers in pairs.
- 7.—Air supplied by compressor car used for sand blasting. Painting with the air brush is another application.
- 8.—Adzing ties in place with the tie tamper fitted with chisel.
- 9.—Drilling rails for bonding. Air is supplied by the tie tamper compressor, and the drill is equipped with a quick-clamping "old man" for rapid work.

Each of these operations, performed on your own line, will help you solve your labor problem and reduce costs.

Write us for further information.

Ingersoll-Rand Company

11 Broadway
New York

165 Q. Victoria St.
London

Offices the World Over

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National Tube Co.

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Arthur Power-Saving Recorder Co.

Economy Electric Devices Co.
Railway Improvement Co.

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Fairbanks Co., The

Pressure Regulators
General Electric Co.
Ohio Brass Co.
Westinghouse Trac. Brake Co.

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Watson-Stillman Co.

Punches, Ticket
American Railway Supply Co.
Bonney-Vehalage Tool Co.
International Register Co., The
McGill Ticket Punch Co.
Wood Co., C. N.

Punching Machinery
Watson-Stillman Co.

Purifiers, Feed Water
Scaife & Sons Co., Wm. B.
Rail Grinders. (See Grinders.)

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Cambria Steel Co.
Midvale Steel & Ordnance Co.

Rails, Relaying
Zeinicker Supply Company, Inc.,
Walter A.

Rail Welding. (See Welding Processes and Apparatus.)

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Brill Co., The J. G.
Electric Service Supplies Co.
Hale & Kilburn Corp.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

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Arthur Power-Saving Recorder Co.

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Electric Service Supplies Co.
International Register Co., The
Ohmer Fare Register Co.
Rooke Automatic Register Co.

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General Electric Co.
Independent Lamp & W. Co.
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Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Reading Specialties Co.

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Columbia M. W. & M. I. Co.
Ellicon Co., The

Resistance, Wire and Tube
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Retrievers, Trolley. (See Catchers and Retrievers, Trolley.)

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Ellicon Co., The
General Electric Co.
Mica Insulator Co.
Westinghouse Elec. & M. Co.

Roofing Building
Barrett Co., The

Standard Paint Co.

Roofing, Car
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Applying Carbosota Creosote Oil to ground line area of pole with spraying machine.



Shaving ground line area of poles.



Brush-treating pole. Note use of a mop, which is more satisfactory than a brush.

Surface Treatment of Poles—

Creosoting poles by the application of surface treatments is effective, *when properly applied*, and will pay a liberal profit on the investment.

It is absolutely necessary that the specifications be strictly followed. "Make-shift" treatments are the result of carelessness, which reasonable supervision and proper instruction of workmen will avoid.

Recommendations for the Surface Treatment of Cedar and Chestnut Poles.

Condition of Poles—Poles should be seasoned until air-dry, and otherwise conform to standard specifications. Green, wet or frozen poles should not be treated under these specifications.

Preparation of Poles—All surfaces which are to be treated should be carefully cleaned of all adhering inner bark. Parts of the exterior surface showing signs of decay, soft or brashy wood, should be shaved off until sound wood is exposed. This is especially important when poles which are to be reset are being treated.

Treatment—Barrett Carbosota Grade-One Liquid Creosote Oil should be heated to about 150 degrees F, and two or more coats applied to that section of the pole extending from one or two feet above, to two or three feet below the future ground line. Application may be made by—

(a) **Brush Treatment**—Applying two or more coats of Carbosota Creosote Oil with a common, wire-bound paint brush, or with an ordinary roofer's mop.

(b) **Spraying** — Mechanical application of two coats of Carbosota Creosote Oil by means of a simple but efficient spray machine, designed to use Creosote Oil.

(c) **Pouring Method**—Pouring two applications of Car-

bosota Creosote Oil over that portion of the pole to be treated from ladles or dippers, catching drippings in a shallow tank placed under poles for that purpose. Each application of Carbosota should be permitted to dry thoroughly before attempting additional treatments (this will require an interval of about 24 hours).

Tops and Gains—Tops and gains of poles should likewise receive two coats of Carbosota Creosote Oil.

Handling Treated Poles. Care should be taken that treated poles are not handled in a manner which will destroy the film of preservative. If the treated section is injured, an additional coat of preservative should be applied previously to setting. That is also advisable if poles have been stored in yard for some time after treatment.

Carbosota Creosote Oil is the universal preservative for the treatment of poles. Specifying Carbosota is the one sure means of obtaining an efficient treatment.



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*World's Largest Maker of Equipment
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Peter Witt Front-Entrance Center-Exit Cars in Youngstown, Ohio, Saving Time

General Manager, Mahoning & Shenango Railway Company in an article on page 656, Souvenir Convention issue Electric Railway Journal, September 27, 1919, states that the average time required for passenger interchange on

their Peter Witt Cars is.....	1.32 sec. per pass.
and on their prepayment cars.....	2.00 " " "
A saving for the Peter Witt Cars of.....	.68 " " "

The Reason

With the conductor near the center doors the entire forward half of the car serves as a long loading platform and with a double line of passengers entering at busy corners speeds up loading. Collecting fares upon entering from passengers going to the rear end reduces number of fares to be collected at unloading points and this also is a time saver.

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ABSORB LARGE CROWDS IN THE QUICKEST TIME**

THE J. G. BRILL COMPANY

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G.C. KUHLMAN CAR CO., Cleveland, Ohio.
WASON MANFG. CO., Springfield, Mass.





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TO THE reduction in headway time necessary to attain the best results with Birney Safety Cars can be attributed the success which this type of street car has achieved. It is on account of this improvement in service that the public is attracted and makes the greater use of the street car service to the advantage of themselves and the railway company. Profitable short riders who would otherwise walk are made patrons of the Birney Safety Cars when they are operated on short headways and there is no disagreeable and time-losing wait on the street corners. Full advantage of this reduction in headway time should be taken in every installation of Birney Safety Cars.



Birney Safety Cars of standard construction can be delivered as soon as painted to suit the purchasers' requirements. Write for list of railway companies operating or about to operate Birney Safety Cars.

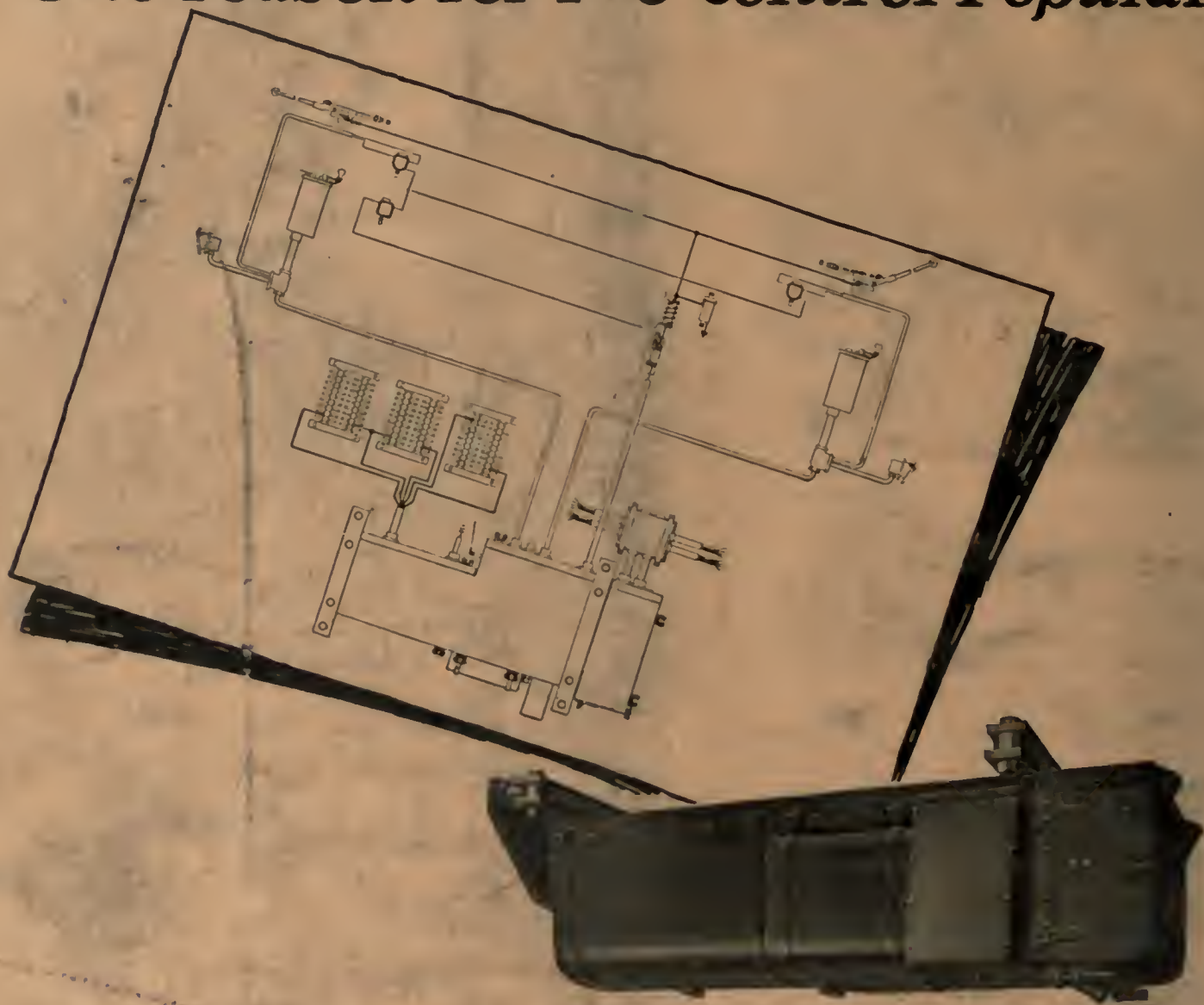
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BETTER TRACK FOR LESS MONEY

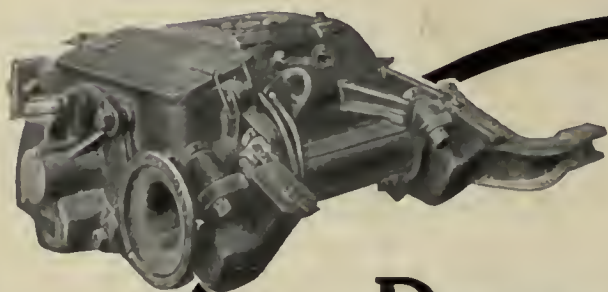
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for essential economies in
first cost and in elimina-
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No. 532 Motors

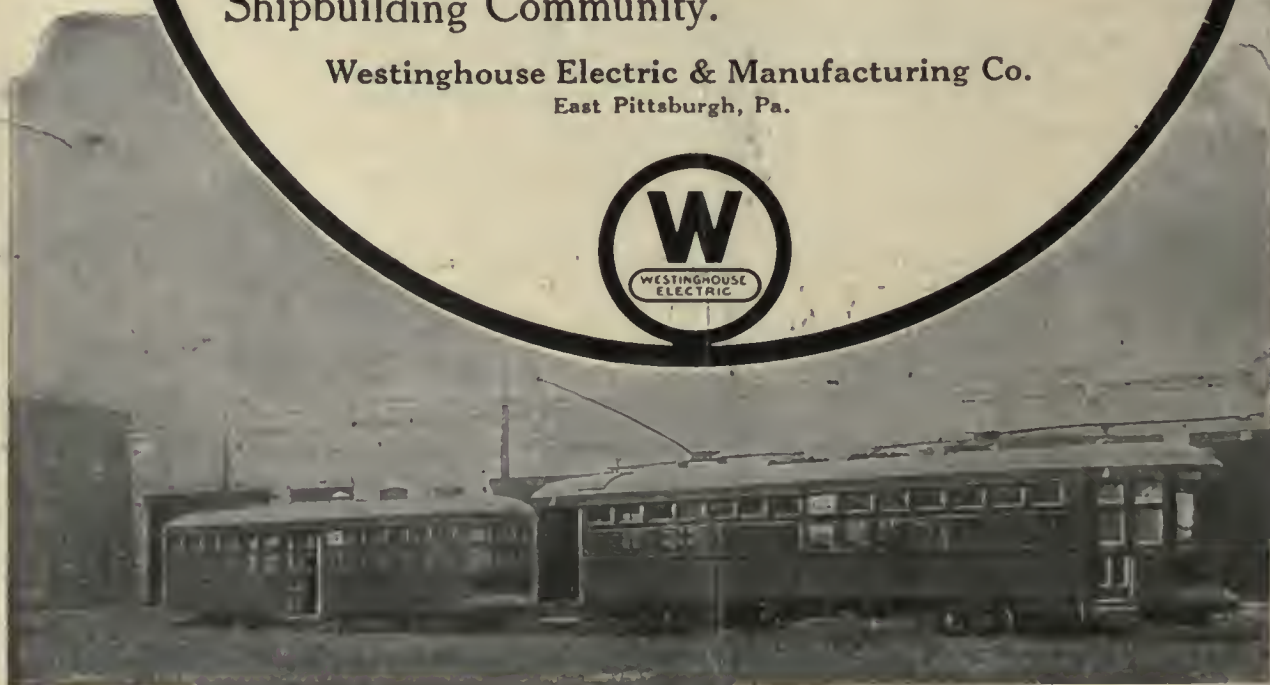


Down In Mobile

The Mobile Light & Railway Company, Mobile, Alabama, have acknowledged the satisfactory operation of Westinghouse No. 532 Motors by placing a repeat order for five quadruple equipments.

These equipments operate on large cars in the heavy passenger service of the Chickasaw Shipbuilding Community.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.



Electric Railway Journal

H. W. BLAKE, *Editor*

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Higher fares, automatic substations, safety cars, and auto bus and truck competition were the subjects discussed at the New York City meeting held on Dec. 10. Abstracts of the papers presented at this meeting are given in this issue.....Page 977

Symposium of Opinions on Freight Haulage by Railways

Authorities in Central Electric Railway Association territory discuss the subject of freight haulage, which was initiated by a paper by C. J. Munton. The contributors include managers and passenger and freight agents...Page 992

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Sail on . . . strong and great!
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So let the experience of the past
A guide to our Future be."*

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The first order for one 2365 hp. stoker was received in 1915. It was a trial order—the first Westinghouse Underfeed to be installed in the Delray Station. On the basis of the performance of this stoker, a second order was received this year.

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You Wouldn't Suppose That Safety Cars Could Operate on Narrow Granby Street, Norfolk, But They Do!



EVERY day brings a new proof of the adaptability of the genuine Safety Car with quick braking and emergency control features.

Now it's operation in Norfolk, Va., which has a collection of old-fashioned, narrow streets that are decidedly out-of-date in this hustling, bustling port. And worst of all is Granby Street where 'most everybody goes to do his or her shopping. Why an auto standing alongside the Granby St. curb actually overlaps the car tracks!

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It is a Safety Car Only—

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National Trolley Guard at intersection of street railway and heavy 1500 volt electric road.



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National Trolley Guard on a road which uses a second trolley, insulated from the first, instead of a bonded return.



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National Trolley Guard Adaptable to Any Condition

No construction difficulty stands in the way of equipping with National Trolley Guard. Because it adapts itself to conditions as they are found.

National Guard is a vital necessity at grade crossings. If the trolley wheel jumps—as it is very likely to with the rough track and high wire usually found on crossings—it runs on the Guard and collects power to carry the car and its load clear of the danger zone.

National Guard is in the form of an inverted trough of open wire mesh. It is light—offers small obstruction to wind and locomotive exhausts.

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*Easy To Install
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OUT on the track the operator welds "Steel to Steel with Steel"—and gets a good job without difficulty.

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illumination."*



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CATCHERS**



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on the car."*



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of the airbrake."*



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real sellers of transportation."*

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road bed knocks in service."*

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Standard on Thousands of Cars

The wide adoption of this car equipment by so many electric railway companies is a stamp of approval of great value to you.

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Many are using all of them.

Birney Safety Cars use six of these specialties (marked by stars on the opposite page) as standard equipment. This equipment has done a lot to assure the success of the safety car.

This great stamp of approval should be sufficient testimonial. Never hesitate to adopt a Keystone Specialty as standard equipment.

Complete data on any or all of them sent on request.

KEYSTONE LAMP GUARDS



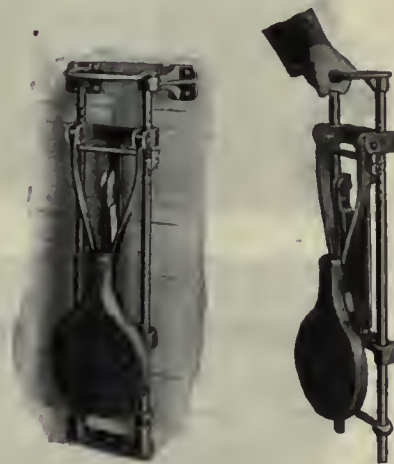
*"Stronger than the men
who use them."*

THE AUTOMOTONEER



"It Controls the Controller."

KEYSTONE MOTORMEN'S SEATS



"Portable and of Great Strength."

ELECTRIC SERVICE SUPPLIES Co.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Streets

NEW YORK
50 Church Street

CHICAGO
Monadnock Building

Car Heating Equipment

Holden & White Electric
Heaters with C-H Units

Detroit JEWEL Forced
Ventilation Coal Stoves

Electric Heater Thermostats

Jewel forced ventilation heaters use one-third less fuel than any other coal stove; they burn any kind of fuel, have only one-third as many parts; are lighter in weight and simpler in design. Westinghouse motor and Sturtevant blower are below the furnace, away from excess heat. Fresh air is taken from the roof. These heaters have passed through all experimental stages and are being installed by some of the largest street railway companies.



Truss Plank Type

These are the simplest, lightest, safest and most rugged electric heaters ever produced. The Cutler-Hammer units are made of Nichrome non-oxidizing wire, wound on sheet mica and enclosed in Armco iron sheath. Not affected by vibration, moisture or hair pins. Enameled steel cases for Cross Seat, Panel, Truss Plank and Vestibule service, ranging in wattage from 300-watt single unit to 2,000-watt four-unit heaters. Can be connected 2 in series on line voltage, or in series of 3, 4, 5, 6 or 8.

We can furnish one of the best known and most highly regarded thermostats.

Illustrated Catalogues Mailed on Request

Holden & White Inc.

817 Fisher Building, Chicago

Eastern Representative, National Railway Appliance Co., New York, Washington



NIAGARA FALLS, N. Y.

You Can Sell Your City a "White Way," Too

AT Niagara Falls, New York, the electric railway company and the city authorities got together and pooled interests in the idea of creating a real "White Way"—a main thoroughfare whose brilliant night lighting would mirror forth the true progressive spirit of the community.

And the "White Way" came into being in a very interesting, practical way. "Elreco" Combination Lighting and Trolley Wire Poles, of tubular steel construction were installed.

These handsome combination Poles took the place of the former unsightly, uneconomical wooden trolley poles, and also of the old-time street lighting fixtures—thus reducing the number of obstructions on the curb line as well as providing the generous illumination desired.

It is a simple matter for the street railway company to start action in a matter like this, and once started, the popularity of the scheme will carry it through very quickly, because it is good business for all concerned.

Write for Catalog "F," showing reproductions from actual photographs of "Elreco" Combination Railway and Lighting Poles installed in many cities. It will stir your enthusiasm!

Electric Railway Equipment Company
Cincinnati, Ohio

30 Church St., New York City



Phono-Electric

Never Fears the Micrometer



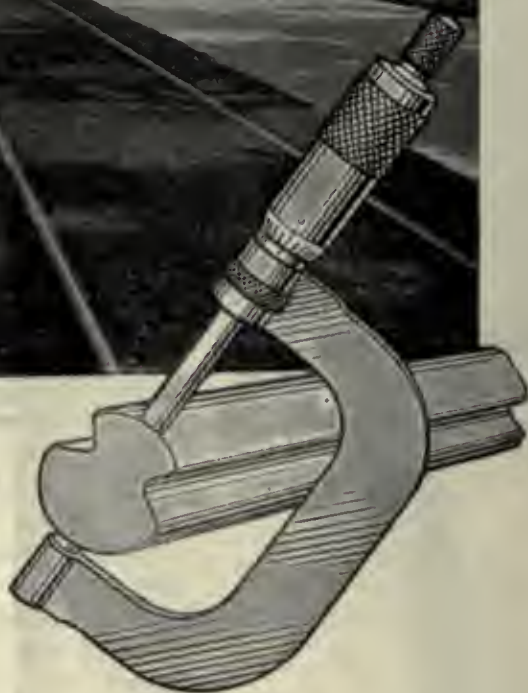
7 miles of Phono-Electric on the Esplanade Belt Line. Installed over 5 years ago.

On the New Orleans Railway & Light Company lines, it is regular practice to micrometer the trolley wire every six months at three points on each span.

One man takes from nine to ten weeks to carry out this job with the accuracy demanded.

It is this attention to the important matter of longevity that has helped the New Orleans Company reach the decision that

Phono-Electric Wire was a worthy standard.



Bridgeport Brass Company

Bridgeport Connecticut



ROCKBESTOS

ASBESTOS COVERED WIRES AND CABLES

Will Eliminate Most of Your Motor Breakdowns

IT'S not the shop cost that is the worst feature of a motor burn-out; it's the transportation and good-will cost.

A few dollars will pay for rewinding the coils. The traffic breakdown due to the failure of the coil can cost hundreds of dollars in lost fares and elapsed platform time. The loss in good will can't be measured off-hand, but it will show up in a good many things from the amount of a jury's verdict to the refusal to grant a higher rate of fare.

Of course, all your troubles aren't going to be wiped out through the elimination of motor breakdowns; but those troubles *can* be reduced in large measure by inexpensive remedies.

One of these remedies is the rejuvenation of all your unreliable motors and compressors with ROCKBESTOS INSULATED WIRE. This will give them that most important quality of a traction motor—ability to withstand high temperatures—and thereby enable your transportation department to put the older cars on higher, more economical schedules without any fear that these cars will slow down the schedule of newer cars operated over the same routes.

It is our business and pleasure to co-operate with you in the cause of modernized service. If you will give us a list of the motors that are not reliable at the higher schedule speeds, we can get together to see how the application of

ROCKBESTOS WIRE

Will Improve Both Speed and Service

ROCKBESTOS as the name implies is an insulation consisting of especially lengthy, fibrous, snowy white asbestos fibre—absolutely free from all foreign matters such as lime, iron, and alumina. It is cemented together with a special chemically neutral compound, producing an indestructible insulation that repels fire and defies time.

Rockbestos is evenly applied to the conductor in such a manner as to insure an adhesive, homogeneous wall of high insulation which is acid proof, alkali proof, moisture proof and fire proof.

Write for samples

MARLIN-ROCKWELL

C O R P O R A T I O N

INSULATED WIRE DIVISION

NEW HAVEN, CONN.



Here's a practical comparison that explains the greater strength of rail joints made with

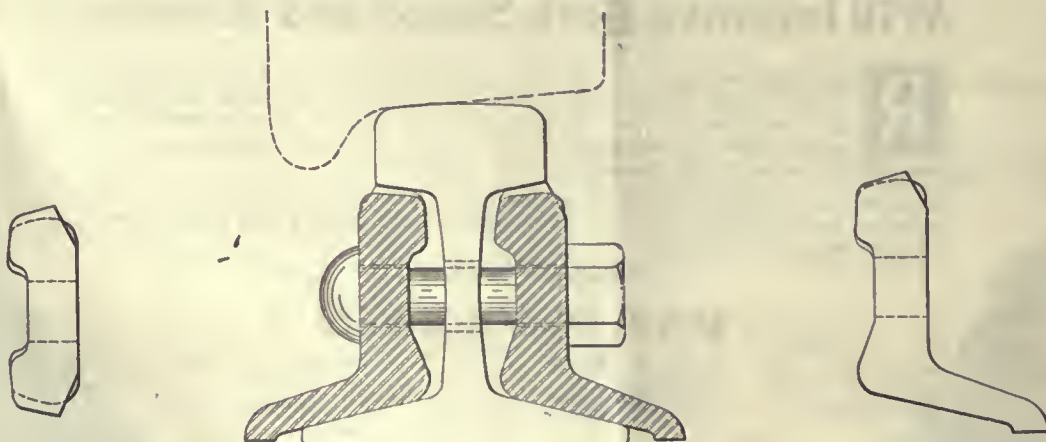
Lackawanna

Safety-head Angle Bars

What do you do when you wish to break a rail in the field? Quite probably you will resort to the time honored practice of nicking the rail with a cold chisel and then dropping it—because you know that once the surface skin is impaired the rest of the rail section breaks easily.

The same line of reasoning applies to the angle bars in a rail joint. With the ordinary angle bars, as the wheel load passes over the joint, the ends of the rail are deflected and the sharp under corners of the rail heads bear upon and cut into the head of the angle bar. Added to this action is the longitudinal mo-

tion of the rails caused by the wave motion in the track and by contraction and expansion. The latter action produces the upset at the center of an ordinary bar, as shown in the illustration. When the load passes the joint and straddles the center of the bar, the thrust is upward, and the tension comes at the center of the splice bar at the top where the wear has occurred. Isn't it logical that this stress will ultimately break the angle bars at this weakened spot? You have the answer in the fact that the bars *do* break here—a serious condition which you have undoubtedly found from your own experience and which you can-



confirm by the experience of other trackmen.

The remedy is in the use of Lackawanna Safety-head Angle Bars

which are made with slight depression at the center to keep the sharp under corners of the rail heads from touching the surface metal of the angle bar. This depression is only $\frac{1}{8}$ -inch deep at the lowest place and about one inch in length, or, in other words, extending only half an inch away from the rail end. The depression is made *while the bar is still hot*. No metal is removed, so that the skin surface is not weakened, nor is the section area of the bar reduced or otherwise weakened at this location.

The Lackawanna Safety-head Angle Bar will therefore do all that an ordinary angle bar will do and is decidedly safer against fracture, as proven in every instance where a careful test has been made.

In addition to the greater protection from accident, and from possible loss of life, property, and delay in service, the use of

The Lackawanna Safety-head Angle Bar is your own section made break-proof

OTHER LACKAWANNA AIDS TO BETTER TRACK

The Lackawanna Deseaming Process

to which all our rails are subjected, leaves the rail head and base free from the cracks and weak, streaky, laminated, partially decarburized metal that under ordinary manufacturing processes is an inherent cause of undue surface wear and rail fractures.

The Lackawanna Hook-Shoulder Tie Plate



is simple, strong, durable, convenient for installation, and by holding the rail with great security prevents undue wear and destruction of material; saves repair costs and reduces maintenance labor.

Two ribs on top form a channel in which the rail base rests. One of the ribs is plain and the other hooked to make a holder. One or two plain spikes on the plain rib complete the bond between plate and both rail flanges. The plate is fastened to the tie by independent plain or screw spikes. The rail may be removed without disturbing the plate.

Lackawanna Track Bolts and Spikes



Our track bolts and spikes of all standard sizes for light or heavy rails enjoy an enviable reputation for careful, accurate workmanship and finish.



Lackawanna Safety-head Angle Bars makes very definite savings in reduced material and labor costs of the fewer renewals necessary, in reducing the labor of inspections, and in better preservation of the rails themselves.

Let us submit some interesting cost and performance data.

The Abbott Rail-Joint Plate



strengthens and otherwise improves ordinary angle bar joints of standard and light tee and girder rails. Its use assures smooth running track surface without the necessity of constantly raising and tamping the joint ties, avoids annoyance and expense from worn and broken bolts and angle bars and

protects the rail ends from battering and breaking down.

The hard steel and combination of reversing flange with the plate provide for internal stresses and imposes the load on the two joint ties with about the same action as between a short deck bridge and its piers. Upturned corner lugs engaging the ends of the angle bars act as anti-creeper and as rail guards to prevent misalignment if the angle bars break or become loose.

Abbott Plates are equally applicable to and advantageous on new or relaid track and will extend the life even of old track for several years. These plates are made in types especially suitable for ordinary steam railway service, for use in paved streets and for welding to the rail base, and may be held with either screw or ordinary spikes.

Write for our booklets, "Lackawanna Deseamed Rails," "Lackawanna Improved Track Appliances," and "Lackawanna Track Bolts and Spikes."

Lackawanna Steel Company

General Sales Office and Works: Lackawanna, N. Y.

Atlanta Boston Buffalo Chicago Cincinnati Cleveland Detroit New York Philadelphia St. Louis San Francisco

Sole Exporter of Our Commercial Products: Consolidated Steel Corporation, 165 Broadway, New York.

DELTABESTON

MAGNET WIRE

HEAT AND MOISTURE PROOF

for windings of
Motors

Lifting Magnets
Portable Drills
Headlights, etc.

Trouble caused by burnouts of windings in apparatus subjected to high temperatures is entirely overcome by the use of "Deltabeston"—the all-asbestos insulated magnet wire.

"Deltabeston" is the ideal magnet wire, the asbestos insulation is no more bulky than silk or cotton and it is not affected by heat or moisture.

The insulation is so flexible that short bends can be made without injuring it and heating of the wire that would destroy silk or cotton covering has no effect on "Deltabeston."

The added advantages of flat or square magnet wires in a variety of sizes enable us to fill your needs.

Details on request.



"DELTABESTON" PREVENTS BURNOUTS

Made in Flat, Square, or Round Shapes in all sizes



D & W Fuse Company
Providence, R.I.
U. S. A.



The Culverts for the Permanent Road

The rust - resisting qualities of ARMCO IRON enable Armco Iron Culverts to withstand the severest strains and exposure to all kinds of weather through years of service.



ARMCO IRON CULVERTS



The culverts here shown, installed 10 years ago on the main line of one of the country's great railroads, are only two of hundreds which after a decade or more of service show not the slightest evidence of deterioration.

There is a manufacturer in nearly every state and in Canada, making genuine rust-resisting ARMCO IRON CULVERTS and other products of ARMCO IRON, such as flumes, siphons, tanks, road signs, roofing, etc. Write for full information and nearest shipping point on products in which you are interested.

**Armco Iron Culvert
& Flume Mfrs. Assn.**

Transportation Building
CHICAGO

The MECHANICAL RAILWAY TIE



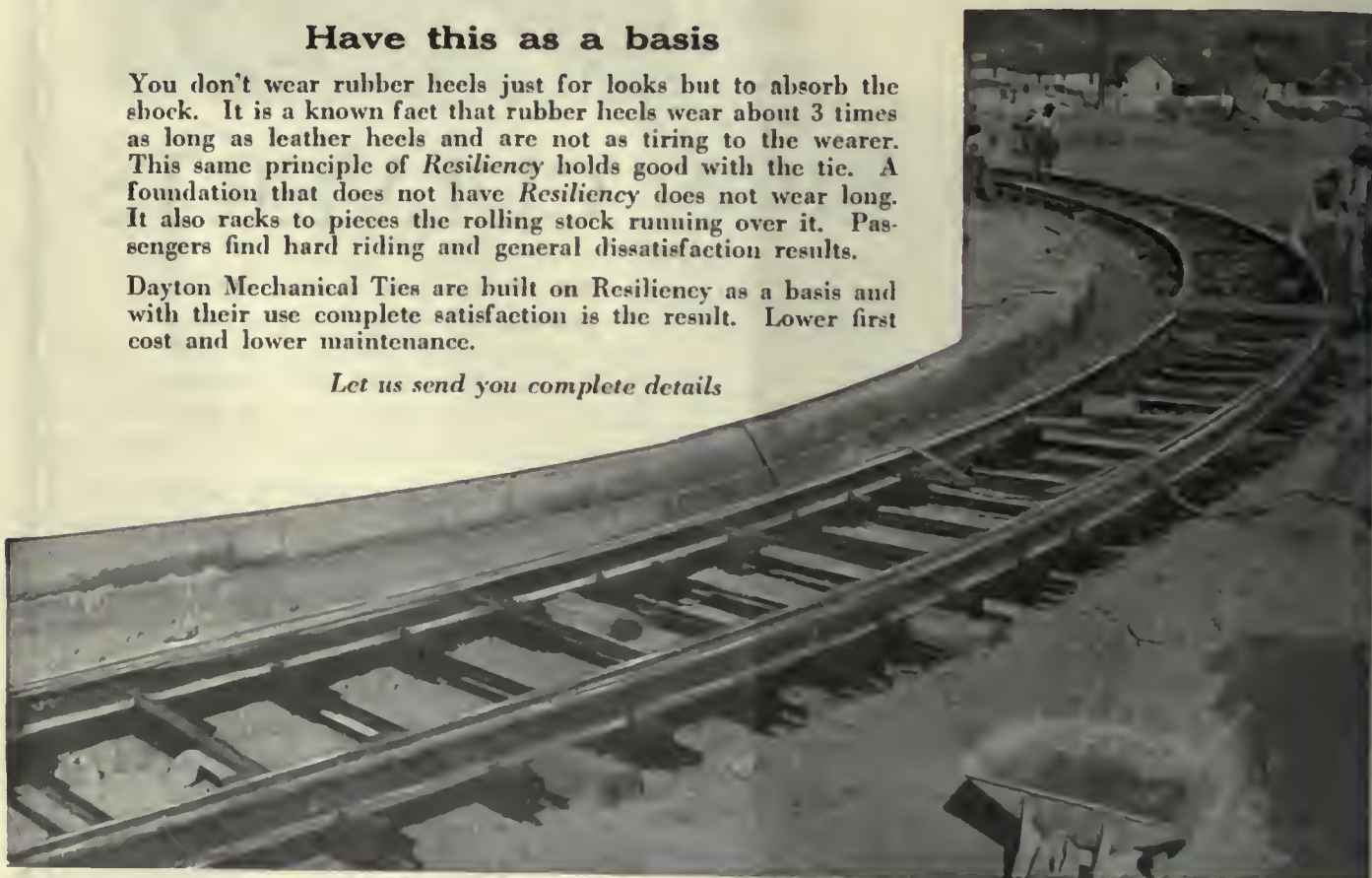
Track Life Depends on *Resiliency* DAYTON MECHANICAL TIES

Have this as a basis

You don't wear rubber heels just for looks but to absorb the shock. It is a known fact that rubber heels wear about 3 times as long as leather heels and are not as tiring to the wearer. This same principle of *Resiliency* holds good with the tie. A foundation that does not have *Resiliency* does not wear long. It also racks to pieces the rolling stock running over it. Passengers find hard riding and general dissatisfaction results.

Dayton Mechanical Ties are built on *Resiliency* as a basis and with their use complete satisfaction is the result. Lower first cost and lower maintenance.

Let us send you complete details



THE DAYTON MECHANICAL TIE CO.
704 Commercial Bldg.
DAYTON, OHIO





“Little Giant” Speed Makes Screw Spikes Economically Practical

LITTLE GIANT Electric Spike Drivers, by virtue of their speed and economy, have made possible the adoption of the screw spike—now widely recognized as far superior to the old nail spike. Screw spikes hold the tie right and do away entirely with that shattering of the fibres of the tie, which invites decay, and which invariably occurs during the sledging in of the nail spike. Today many railways are using the screw

The Little Giant Electric Spike Driver is but one of a line of electric tools for railway shop and track work, of which Little Giant Drills, Track Drills and Grinders, and Boyer Pneumatic Hammers are important members. Write for Bulletins.

spike—and “Little Giants” for driving them. Watch a “Little Giant” on the job. The spike is set; over the head the operator places the “Little Giant;” the turn of a switch and the powerful rotary tool is screwing down the spike. When the pressure of the spike head against the rail has reached a predetermined amount—off goes the circuit breaker—and the drill stops. This means uniform holding tension at every spike.

Chicago Pneumatic Tool Company, 1062 Fisher Building, Chicago

Sales and Service Branches all over the World

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BOSTON CINCINNATI CLEVELAND EL PASO HOUSTON LOS ANGELES NEW ORLEANS PITTSBURGH PORTLAND SALT LAKE CITY SAN FRANCISCO TUCKER BOMBAY BUENOS AIRES CADIZ FLORHAM PARK HAVANA JOHANNESBURG LISBON MADRID MANILA OSAKA TOKYO WASHINGTON

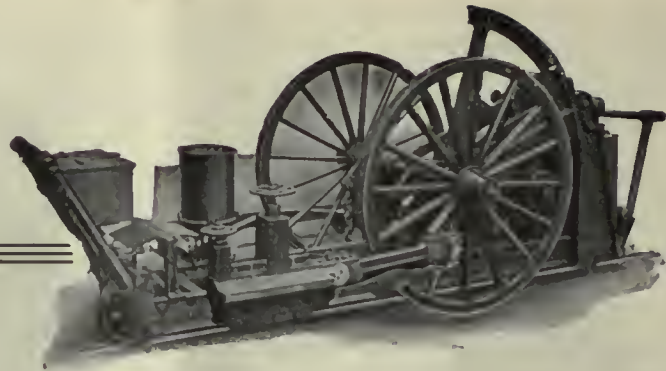
EL 19

BOYER PNEUMATIC HAMMERS · LITTLE GIANT PNEUMATIC AND ELECTRIC TOOLS
CHICAGO PNEUMATIC AIR COMPRESSORS · VACUUM PUMPS · PNEUMATIC HOISTS,
GIANT OIL AND GAS ENGINES · ROCK DRILLS · COAL DRILLS

LITTLE
Electric



GIANT
Tools



Where Unskilled Labor Works as Well as Skilled Labor

It seems to be the feeling of some Electric Railways that in order to get successful Track grinding results a skilled mechanic is necessary for the operation of the Track Grinder.

This is not so. The Reciprocating Track Grinder is so simple that after a few days' instructions any man on your track force can operate it with the greatest amount of success.

For those who still are pessimistic about the need of and the ease with which it can be used we offer to put a Reciprocating Track Grinder at work on your own tracks. This trial if you are not satisfied will cost you nothing. To make the test we will use your own men. This offer should interest you and we await your commands.

Largest manufacturer of both Reciprocating and Rotary Track Grinders in the World.

Railway Track-work Co.

30th and Walnut Sts., Philadelphia

EXCLUSIVE AGENTS

Middle West
ATLAS RAILWAY SUPPLY CO.
Chicago, Ill.

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MANUFACTURING CO.
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EXCLUSIVE AGENTS

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CHARLES N. WOOD CO.
Boston, Mass.

HITCHCOCK, LLOYD & CO., Inc.
77A Queen Victoria Street, E. C.
London, England



One of a fleet of seven White Trucks operated by the Rochester Railway & Light Co., Rochester, N. Y.

WHITE HEAVY DUTY TRUCKS *with Double Reduction Gear Drive*

White Trucks are noted for economy in operation. They have always been designed with that one end in view.

The 3-3½ and 5-ton models with Double Reduction Gear

Drive reach a new low level in the cost of heavy hauling. They surpass all previous accomplishments in the way of *doing the most work for the least money.*

The fuel saving alone is a big item.



THE WHITE COMPANY, *Cleveland*



The Triangle of COLLIER SERVICE

A Service which nets the advertiser satisfactory returns on his advertising investment and assures the electric railway an unfailing income from its car card space.

Since it costs hundreds of dollars to conceive, design and print a car card which produces results, and—

Since local advertising contractors cannot afford to give a service which makes car card advertising a paying proposition to the advertiser—

An organization as wide in scope as COLLIER SERVICE has been created to meet this requirement and a continuous source of revenue is thus assured to the railway company.

Barron G. Collier
INCORPORATED

Candler Building
220 West 42nd Street, New York City

North Shore Line Orders More Economy Power Saving Meters



THE Chicago, North Shore & Milwaukee R. R., a double track road, operating high speed inter-urban service between Chicago and Milwaukee, and also local city service in Waukegan and Milwaukee has had all its cars completely equipped with Economy Meters since 1915.

Based on the service rendered, the railway company has just placed an order for twenty-five additional Economy Meters to be installed on fifteen new inter-urban and ten safety cars being built by the Cincinnati Car Company.

Economy Meters installed on your cars will conserve energy, promote safe operation and encourage better public service.

Meter the Energy! That's what you want to save.

Economy Electric Devices Company

General Sales Agent

SANGAMO ECONOMY RAILWAY METER, Old Colony Bldg., Chicago

National Railway Appliance Co., New York
L. A. Nott, San Francisco

Burton R. Stare Co., Seattle
J. G. Monahan, Los Angeles

Ludwig Hommel & Co., Pittsburgh



Lenses are Easily Replaced in **STOCO** SAFETY GOGGLES **CELOGLAS** SHATTER-PROOF LENS

REPLACING a pair of lenses in **STOCO** Safety Goggles is only a matter of seconds. You don't even need the pliers shown in the illustration. A pencil will do—or a good stout thumb-nail. If your stock clerk is ruining his chances of salvation while he juggles a tiny screw driver and a microscopic screw replacing pitted lenses he'll appreciate this feature.

Price per Hundred

With extra heavy optical glass lenses.....	\$90.00
With Celoglas Shatter-proof lenses.....	115.00

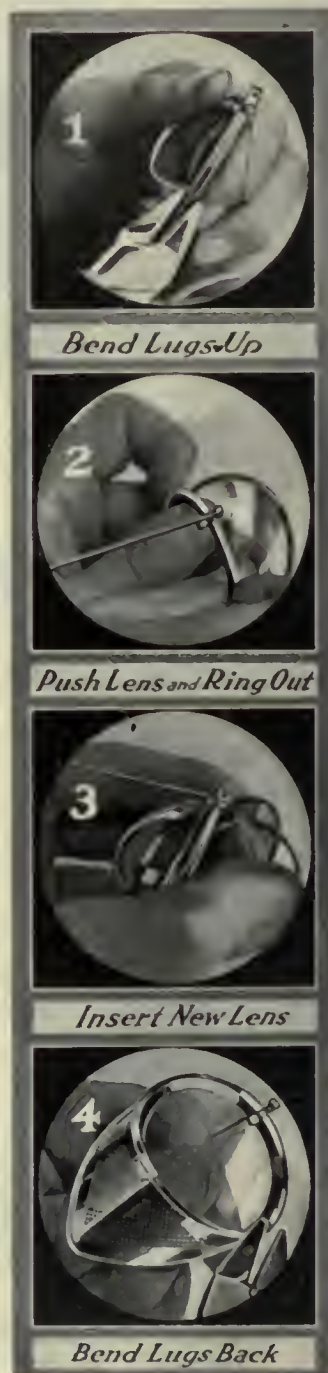
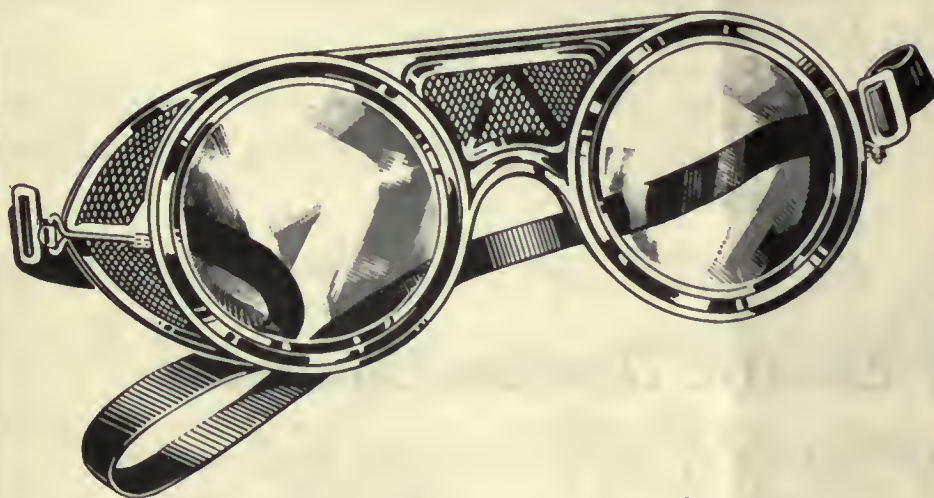
Attractive discounts for quantity orders.

LENSES ONLY

Per Hundred Pairs

Extra heavy optical glass lenses.....	\$30.00
Celoglas Shatter-proof lenses.....	55.00

A sample of the **STOCO** Safety Goggles will be sent without charge to interested responsible people.



STANDARD OPTICAL CO. GENEVA, N.Y.



NATIONAL PNEUMATIC DOOR AND STEP CONTROL WILL PERMIT ONE-MAN CAR OPERATION OF THOSE BIG-CAPACITY CARS

Perhaps you are one of those operators who have to handle big factory crowds under conditions where track capacity is limited and therefore feel that you must stick to your present big-capacity **two-man** cars for the rush hours at least.

But the application of National Pneumatic door and step control with quick-starting and safety interlock features will solve for you the problem of using one-man car operation with no sacrifice of car capacity.

Should you feel that the loading at factory gates without prepayment areas could be speeded up still more, there is nothing to prevent you from having one auxiliary fare collector take care of the rear end of successive cars while the operators of the cars are taking care of the front end.

Once the cars are on their way you may feel assured that the application of National Pneumatic Door and Step Control will enable to make even better time in getting over the line—whether single or double track—than was possible with the same cars carrying two men with hand-operated doors and steps.

National Pneumatic car speed-up devices for one-man operation pay for themselves almost before your auditor has gotten 'round to O.K'ing their cost! A blue print of your present big cars and a brief statement of your conditions will elicit a reply from us at once.

NATIONAL PNEUMATIC COMPANY

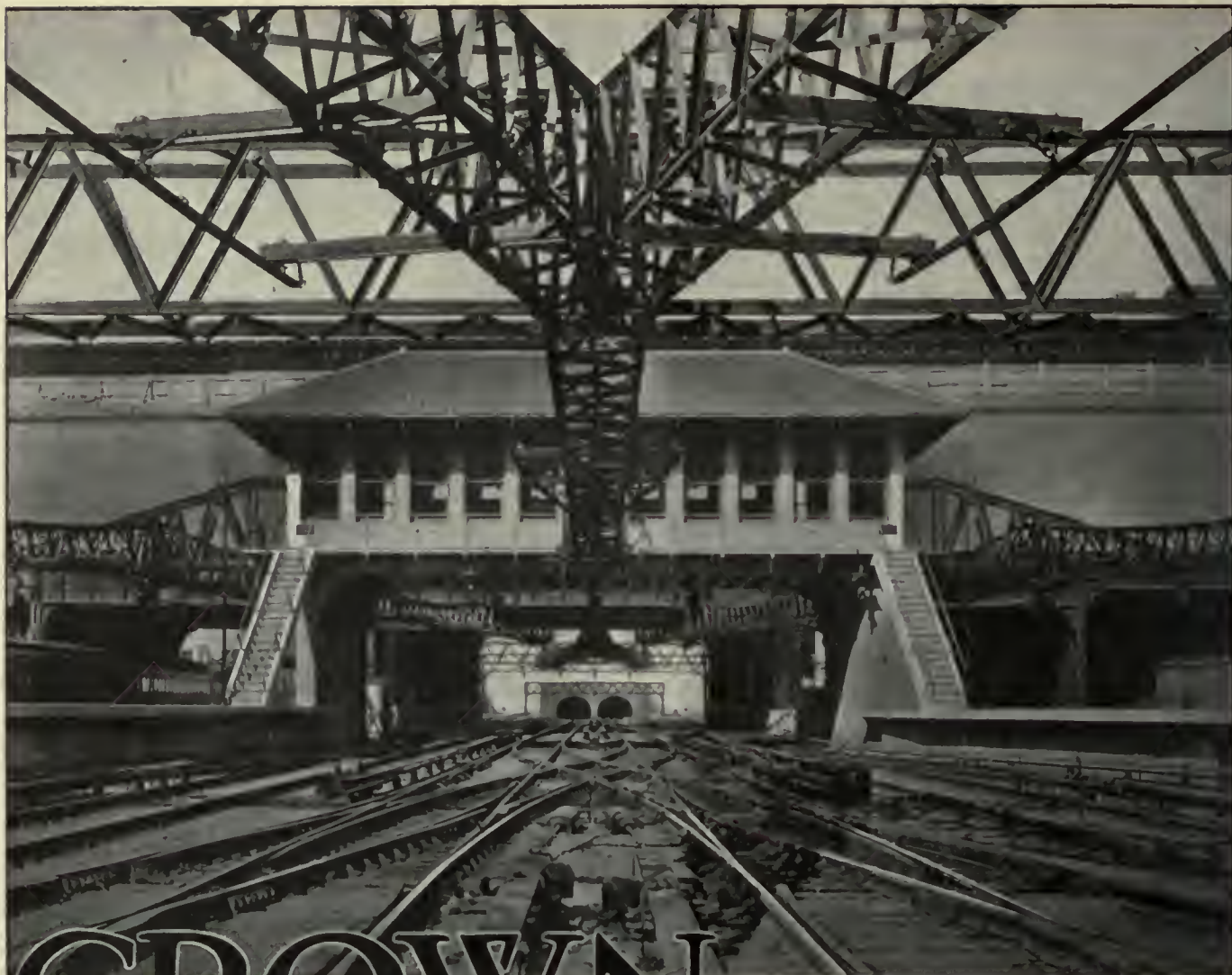
INC.



50 Church Street, New York

Edison Bldg., Chicago

Works: Rahway, N. J.



CROWN Rail Bonds

Made by
**American
Steel & Wire
Company**

Chicago New York Cleveland Pittsburgh Denver
United States Steel Products Co.

Pacific Coast Department:
San Francisco Los Angeles Portland Seattle
Export Department: 30 Church St., New York



Showing Installation of
400000 cm. Flexible Crown
Rail Bonds Applied Around
the Joint, on Rails of
Pennsylvania Terminal,
New York City.



"He can check it with his own watch"

First—Because it talks the language of the motorman. It measures the power-on time—and (note this for it is important) it measures it in terms that the motorman understands—minutes. If you want to save power, encourage the motorman to shut it off by recording the minutes he has the power on.

Second—It encourages legitimate coasting without holding off the brakes until the last second each time.

It encourages the motorman to run with the power shut off—the natural way to save power and also the safest method of operation.

Third—The motorman has faith in the Arthur Recorder for the reason that he understands it easily. If necessary he can check it up with his own watch at any time. Because of this his cooperation is more easily obtained and better power-saving results are produced than where the motorman is more or less working in the dark.

Fourth—It requires but little clerical work to follow up the records.

Fifth—Where desired its figures can be used as a basis for arriving at car inspection intervals, so doing away with the cost of obtaining individual car mileages.

**The Arthur
Power-Saving Recorder Co.**
New Haven, Conn.

7 Reasons

why you should choose

Arthur Power-Saving Recorders

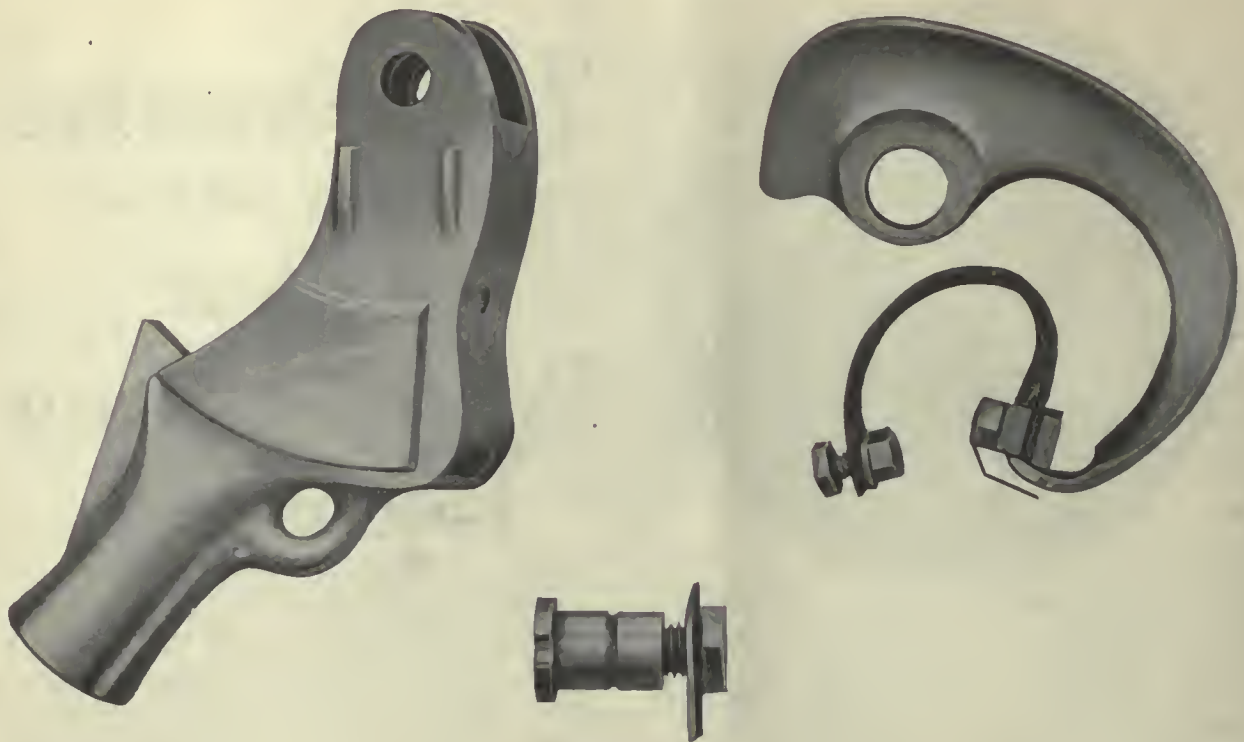
Cars can be inspected on a "service" rather than on a mileage or daily basis. *Sixth*—Since it costs comparatively little and saves a great deal, it follows that it will pay for itself on any property in a very short time.

Seventh—You don't have to buy Arthur Recorders. If desired we rent them on easy terms and allow the full amount of the rental payments to apply on the purchase price.

The advantages of Arthur Recorders are substantiated by the solidest kind of facts, by hard cash saved on large scale properties.



"It Talks the Language of the Motorman."



Simple—Still Highly Efficient

SIMPLICITY is what we are all striving to obtain. In order to get this we do not want to overlook the fundamental principles and sacrifice efficiency.

The Miller Trolley Shoe is a step in advance of other current collecting devices in that it is the most efficient and the simplest. Com-

bining these two points to such a high degree was our original aim and so well have we succeeded that today the Miller Trolley Shoe is in a class by itself.

The sliding type of contact has proven its superiority over other types and requires much less attention.

Let us show you what we have done for numerous other roads. Remember Miller Trolley Shoes work equally well on both city and suburban service. Write for details today.

Miller Trolley Shoe Company, West Newton, Mass.

SPECIAL REPRESENTATIVE: Holden & White, Inc., Chicago

EASTERN REPRESENTATIVE: National Railway Appliance Co., New York

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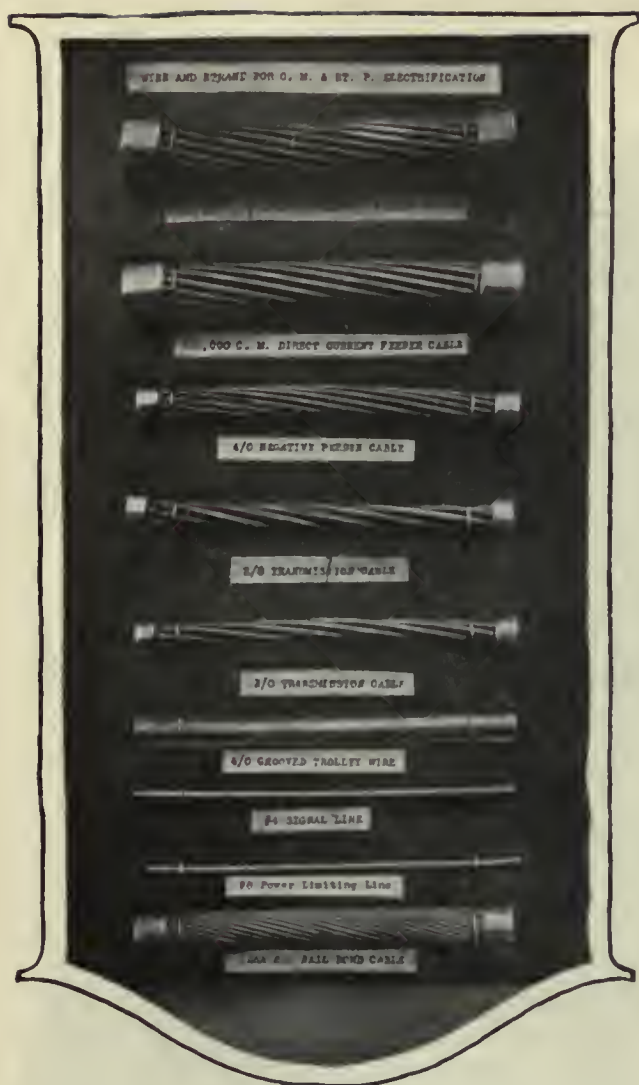


Experience with car-wheels proves there are none tougher, more resilient, more uniform, more dependable and longer wearing than Davis One-Wear Steel Wheels.

They are the standard for electric railway service.

AMERICAN
STEEL FOUNDRIES
1100 McCormick Building
CHICAGO

DAVIS STEEL WHEELS



General Offices
Rolling Mills Dept.
CHICAGO, ILL.



Anaconda Copper Wire

—in the Electric
Railway Field



ELECTRIC roads in every part of the continent realize that for overhead construction, a wire of great strength and durability is essential if satisfactory results are to be secured.

For that reason, a rapidly increasing number specify Anaconda Copper Wire for this class of work.

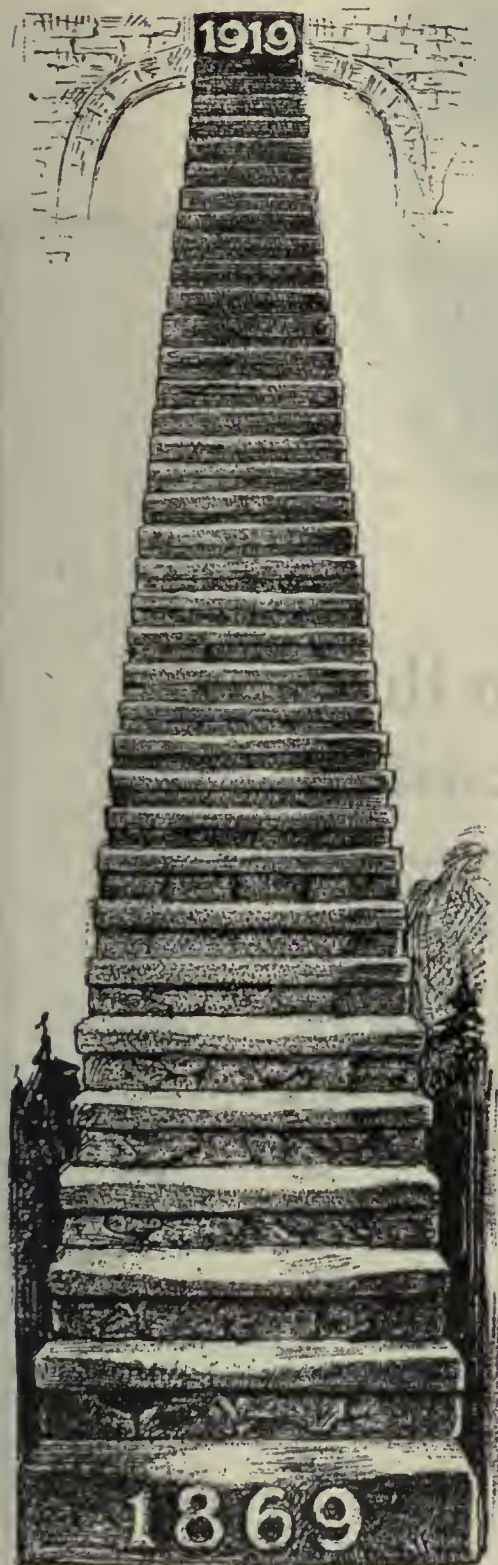
Through years of experience they have learned that Anaconda Products are quality products—built to last—built to serve faithfully—built to reduce maintenance costs.

More than 6,000,000 pounds of Anaconda Copper Wire and Cable were used in a single electrification project—proof positive of their leadership in the Electric Railway Field.

Our Engineering Department is at your service and will furnish complete data on request.

ANACONDA COPPER MINING CO.
Rolling Mills Dept. Great Falls, Montana

50 Years of Galena Quality



When in 1869 this Company first marketed lubricating oil with which oxide of lead was carried in suspension it marked a great step forward in the quality of lubricants.

If our standards of quality had stopped, however, with that achievement, important as it was and has continued to be, our progress would probably have slowed up way back in horse-car days.

On the contrary

Galena Oils

have not only kept up with the reputation for superiority established in those early days but have maintained position a step or two ahead of it.

How successfully that endeavor has been maintained is best shown by the fact that still after 50 years Galena quality is standard with the great majority of the country's railway lines.

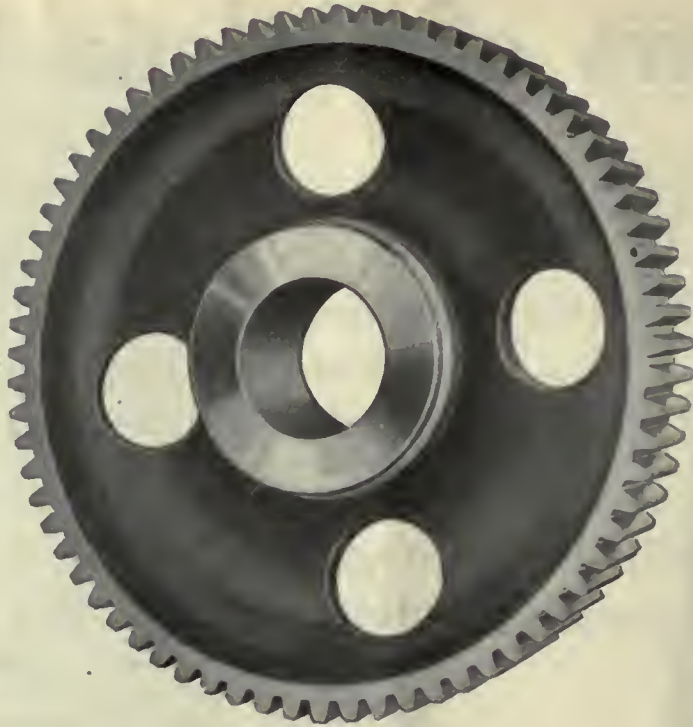
Galena-Signal Oil Company, Franklin, Pa.

New York

Franklin, Pa.

Chicago

Works at Franklin, Pa. Parkersburg, W. Va. Whiting, Ind. St. Louis, Mo. Bayway, N. J. Toronto, Can. Rouen, France
Offices in all Principal Cities of U. S. London Buenos Aires Paris



Gearing that helps in the fight against rising costs

Gears that can be depended upon for heavy duty—that do not break under sudden shocks or severe strain—gears that will wear long after other grades have been scrapped—such gears are

Grade M

The More Miles-per-Dollar Gearing

It is true economy to purchase a quality of gearing that will mean a smaller cost per year of operation. There is no doubt of this with Grade M. Their "more miles per dollar" service has been amply demonstrated by the experience of many users over a period of years. Nearly every large electric railway in the United States is an enthusiastic user of Grade M. How much longer can YOUR road afford to be without them?

Send for bulletin 44419

General  **Electric**
Company

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Sales Offices in all
large cities

40-111

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 54

New York, Saturday, December 20, 1919

Number 21

New York Developments Indicate Possible Municipal Ownership

THE latest development in New York City traction affairs seems to be a movement toward municipal ownership, first of the rapid transit lines and later of the surface lines, or some of them. The basis of the transfer, if the present plan is carried out, is to be a fair appraisal of the properties on which the city will pay a reasonable rate of interest and then that fares will be charged sufficient to amortize the purchase price within about twenty years. At the time at which this statement is being written, the plan had reached only its preliminary stage and neither the Mayor nor representatives of the Board of Estimate had publicly expressed any comments on the proposal nor had it been before the boards of directors of the companies.

Such a plan would undoubtedly be welcomed by the owners of the securities, who have seen the value of their holdings greatly diminished during the past two years, because of the refusal of the city authorities to grant increases in fares. Just what the public will gain by the change, however, if it is carried through, is another question. It is too much to expect that the city will operate the system anywhere nearly as efficiently as has been done by the present owners, nor is it likely that the service will be as good. The ventures of the city into other commercial fields, such as ferry operation, are certainly not such as to encourage any further activities of a like nature. If the city authorities are wise they will arrange for the operation of the lines in such a way, if possible, as to preserve the advantages of private management, even if they cannot retain the benefits of private initiative. Whether this can be done with the New York transportation lines under the control of the city remains to be seen.

Synchronizing Revenues with Wage Increases

THE decision of the Railroad Commission of Wisconsin in the Milwaukee case, reported in the last issue of this paper, is the first order under the law enacted at the last session of the Wisconsin Legislature, which establishes a definite relation between wages and rates. Briefly, the law provides for arbitration of disputes in regard to wages on public utilities by the State Board of Conciliation, and then for a determination by the Railroad Commission of the State of the ability of the company to pay the increase, if one is granted. If the Railroad Commission finds, as a result of its inquiry, that the surplus of the company, after paying a fair return on the investment in its property, is insufficient to pay the increased wages awarded, the law places upon the commission the duty of supplying

the company with sufficient revenues for this purpose. In other words, the law is the first practical application of the attempt directly to synchronize increases in revenues with increases in wages, which has frequently been suggested, and it should prove in this respect far more effective and satisfactory to all parties concerned than the condolences, recommendations and admonitions of the late War Labor Board.

The new regulation must also be of great satisfaction to labor because it provides for arbitration of labor's demands through a State board and insures the payment of the award of this board through all the powers of the regulating commission. It therefore makes strikes unnecessary, as the interests of the three parties—labor, capital and the public—are automatically reconciled. The new law has a further effect which is apparent from a reading of the appendix to the decision of the Railroad Commission of Wisconsin. Since it insures a fixed return upon the investment, it establishes a more or less automatic scheme of adjustment of fares, in other words, a service-at-cost plan, under State commission regulation. It is thus again unique because all previous electric railway service-at-cost plans in this country have been either under the direction of a municipal commission or, in the case of Massachusetts, of a special commission appointed by the Governor.

Actual Experience Data of Automatic Substation Operation

AUTOMATIC control of substation equipment has now been in use long enough to have permitted the "bugs" to be eliminated from the relay and switch design and to allow the operators to accumulate some reliable data that will be useful to themselves and others in future expansion along this line. In the issue of this paper for March 22, 1919, page 565, E. J. Nash, electrical engineer, Butte (Mont.) Electric Railway, told of the results of a year's experience with "automatics" on that property. He plans shortly to supplement this with the 1919 record. In the five-in-one combined number issued on Dec. 13, 1919, page 886, R. J. Wensley, a Westinghouse engineer who has had a great deal of experience in this matter from the manufacturers' side, gave a frank summary of the trials and tribulations of the inventor with the apparatus. This week we are pleased to give an abstract of a paper by C. L. Cadle, presented before the New York Electric Railway Association at its New York City meeting held last week. In this he gives some convincing statistics which will prove cheering in these days of high labor costs. These data will be appreciated by manufacturer and railway operator alike, for they show what can be expected in many other locations if moderate sums of money are invested intelligently.

In his tabulations Mr. Cadle estimates, in the cases of the two stations with which he has had personal experience, the number of years necessary for the control equipment to purchase itself. This number proves to be so small as to be considered negligible when compared with the probable useful life of the equipment. It ought then to be easy to "sell" the idea of automatic control to the executive officers of a railway company when the advantages are so self-evident. The industry is now too dependent upon labor and is not dependent enough as yet on automatic devices in several departments, of which the power distribution division is cited here as an example. The same service could be given with fewer men, or better service with the present force, if the same principle, that is the use of labor-eliminating equipment, were further and more diligently applied in the cars, on the track, in the power plant, in the counting room, etc. Give the engineer a fair chance in all of these fields and he will show results.

Planning to Combat Coal Famines

IN THE good old days "befo' de war," we as a people worried very little about the problem of our fuel supply. Coal, water, and air were on somewhat the same basis. They did not trouble anyone very much but were procurable at any time and in any quantity needed. Only a few scientists and other folk of the ilk who love to peer into the future, and whom the common people usually prefer to consider otherwise than seriously, were at all concerned about our coal supply. But now for a second time within two years the country has found itself in the throes of a fuel famine, and it begins to look as if vigorous action on the part of all the people, instead of dreaming on the part of a few, must begin. It is not our thought to discuss here the causes of these fuel shortages; it is sufficient for our purpose to point out that the immediate causes at least were not the same. Further, with labor conditions in the steam railway field as they are at present, future coal famines are not difficult to imagine.

Now the lifeblood of all industry in this age of machinery is motive power, and we know how to get motive power in bulk only in two ways, namely, from coal and from running water. If we are to have motive power when and where we need it we must so develop our motive power resources that war, weather or the selfish desires of one class of our people can have but a minimum influence on motive power production. The attainment of this end, so far as electric power is concerned, means that our steam electric stations to a considerable extent must move to the coal mines, our water power must be developed and our electric transmission systems must be interconnected.

It is beyond our purpose to outline the advantages of super-power stations at the mine mouth, hydroelectric power and interconnected electric systems. These advantages have been set forth at length time and time again in our technical press within recent years. The most notable proposal along these lines is the investigation recommended to Congress by Secretary Lane to determine what can be done in the way of a super-power tie line in the industrial district along the Northeast Atlantic Seaboard, but pioneer work of this kind under private initiative has already been done, notably in New England and among the great water-power com-

panies of the West. It is our purpose here principally to emphasize that the electric railways, as big electric power producers and users, should by setting a proper example do their share in developing the power resources of the country along right lines and that we electric railway men as individuals must use our energy and our influence in moulding public opinion to the same end.

How Can Railways Train Men to Be Good Welders?

THE use of welding by electric railways for reclaiming worn parts and for reducing the cost of repair work has increased tremendously in the last few years. The necessity for some type of welding apparatus as part of the shop equipment is generally recognized, and many railways are now facing the problem of developing and training men who can be depended upon to carry on this work. If an attempt is made to draw trained men from other industries, it will be found that the supply of good welders is far behind the demand. When a carpenter, machinist or blacksmith is needed, an advertisement in a local paper is pretty sure to supply whatever help is required, but an advertisement for a welder is almost certain to go unanswered.

The operator's ability is now generally conceded to be the most important factor in producing good welds. The number of men who have had some experience in oxy-acetylene cutting and welding is more pronounced than those familiar with electric welding, and many roads which have previously operated gas welding outfits have used men familiar with this work for electric welding with good results. Where it is necessary to train a man with no previous experience, his former occupation must be carefully taken into account. Experience as a blacksmith, machinist, boiler maker, pattern maker, sheet-metal worker, moulder, electrician, or in several other kindred occupations, will in every case be found of great value. Any experience in handling metals as well as all mechanical experience is a valuable asset, and it has been found that men with such training take up the work more readily and become expert welders more rapidly. The man, of course, must feel an interest in the work, as it is this interest combined with ingenuity which will enable him to handle the new problems successfully and aid him in developing better and more efficient ways for carrying on the work.

During the war, the training of electric welding operators was taken up by the education and training section of the Emergency Fleet Corporation. Schools for training operators and for educating operators to become instructors were established in many sections. These training courses consisted of familiarizing the men with various parts and uses of welding equipment, of giving the men intensive practice in work to make good craftsmen of them, of explaining to them the various safety precautions and protection necessary, and, finally, a course in the theoretical characteristics of welding. The men thus trained were taken principally from the shipbuilding industry and were returned to their employers after the course was completed.

At present there is a need for good welders, not half trained men, and any training course adopted should aim to turn out a good welder who not only has manipulative skill but, in addition, is well versed in

the theoretical knowledge of the subject. Various exercises and practices in the work will produce the required skill, and the interested worker will gladly read papers and books describing the theory of uniting metals by welding if these are readily obtainable. Manufacturers of welding equipment are naturally very anxious to have their apparatus efficiently handled and are in a position to furnish valuable assistance in training men for the work.

Will the Screw Spike Replace the Cut Spike on Electric Railways?

ARAILROAD spike seems to be a comparatively insignificant part of a track structure. In spite of this seeming unimportance, the spike is now receiving a great deal of study in conjunction with all other details of what are usually considered minor track fastenings, such as tie plates, rail braces and track bolts. For years our railroads knew no other rail fastening than the so-called standard hookhead or cut spike. Within the last few years, however, the demand for better fastenings and greater permanency has led to numerous experiments with, and adoption of, the screw spike.

This, at first, was hailed as the final solution of the spiking problem. Along with the steam roads, quite a few electric railways adopted it as standard. Nevertheless, a great many electric railway track engineers and not a few of their steam-road brethren have felt that the screw spike did not warrant its greater first cost. This view finds support in a recent report of the Pennsylvania Railroad engineers, covering extensive experiments with the comparative merits and maintenance costs of the two types of spikes, the results of which show that the screw spike is not only much greater in first cost than the cut spike, but also greater in maintenance cost, and less reliable as a permanent fastening. The chief trouble appears to be due to the fact that no satisfactory method has been found which permits the screw spike to obtain a firm hold in the tie, once it has been loosened.

One of the particular points advanced in favor of the screw spike has been its greater holding power or resistance to withdrawal. The Pennsylvania report states that while it does have a greater initial resistance to withdrawal, it ultimately becomes entirely loose under the continual raising action of the rail. Meanwhile, under similar circumstances, the cut spike will retain a considerable portion of its holding power.

In the electric railway field, a recent questionnaire covering the screw-spike question, circulated by one of the large Eastern companies, resulted in replies of which the majority indicated that electric railway engineers have not found the use of the screw spike justifiable for ordinary electric railway conditions either on private right-of-way or in paved streets. Here it may be noted that the screw spike is not used either in the New York subways or upon the elevated roads, except under certain conditions at stations and other special locations.

We are inclined to the belief that the cut spike will continue as the standard rail fastening for electric railways, but attention is called to the point that recent experiments made at the civil engineering laboratories of Columbia University indicate the value of preboring holes in the ties to receive the spikes. The crushing and bunching of the wood fibers are thus materially

reduced and the elasticity of the fibers, upon which the resistance to withdrawal partly depends, is retained to a far greater degree and over a long period. It should also be noted that preboring should be done before creosoting or other treatment is applied. Attention is again called to the desirability of making new comparative tests of standard cut spikes made with the regular chisel point and with the Goldie point. The latter should prove the better of the two because its shape should lessen the crushing and bunching of the wood fibers, due to its better cutting action, and it is believed that the Goldie point will insure the best results when driven in prebored holes.

Upon occasion it may be necessary to resort to the practice of double spiking of the rails in order to reduce the load which each spike must sustain in resisting withdrawal, and it will be found advisable to give close attention to such details if the most effective use of the cut spike is to be obtained.

Co-operate With Those Who Need Your Riders

HOW much capital are electric railways making of the fact that the merchant and amusement purveyor need the electric railway rider even more than the electric railway itself? For every shopper or pleasure seeker that the electric railway carries, it does not make as much as one cent per round trip. On the other hand, the profit which this class of rider brings to the business or theatrical man is anywhere from twice that humble figure to several dollars! Therefore, these classes of the public have a very live and materialistic interest in the ability of the electric railway to maintain a high standard of service. In spite of this fact they are often the chief grouseers, grumblers and grouches with no conception whatever of what they could do to help the railway along.

For this attitude we fear the electric railways themselves are largely to blame. They go on with the same, or declining schedules year after year under the impression that no one is scanning their actions with any degree of care. This is not so. The business or amusement fan who is at all observant can tell with disconcerting precision just why his west-side customers average more visits to his place than do his east-side customers. He will tell you that it is largely a difference in service. The patron who comes in on a five-minute line is around oftener than the one who lives on a route with ten-minute service. The latter is a lot more likely to telephone, thus buying less than in personal shopping, or to put off her purchases and pleasures until the Saturday peak when she cannot be served and sold so advantageously.

The attractors and exploiters of street railway traffic have so large a stake in the well-being of the railway that they should not be kept in ignorance of the great help that they can give to the railway and themselves if they will lend their show window space, picture screens and advertising copy to pushing any service-betterment plan that the railway may have, be it so small a matter as the sale of tickets or so large a matter as financing the purchase of new equipment with local money. Let the railway management but get close to these men, and it will be most agreeably astonished at their willingness to co-operate in the development of the transportation business, which is an important feeder for their own.



CARS IN STORAGE IN MICHIGAN

Toledo Walked While Cars Rested in Michigan

In Compliance With "Ouster" Ordinance Passed on Nov. 8, Toledo Railways & Light Company Removed All Cars From the City and No Wheels Turned Until Dec. 5

FOR practically four weeks beginning Nov. 8, citizens of Toledo, Ohio, walked to and from their business in the loop district or rode in buses while the street cars rested peacefully across the line in the State of Michigan. On Nov. 8 an ordinance was officially passed "ousting" the Toledo Railways & Light Company from the streets and at midnight the company quietly obeyed the public decree and placed its cars where they would be safe from injunction proceedings and the lawless element. Thus was brought to a close a long drawn-out chapter in the traction controversy history of Toledo. The next chapter opened almost a month later when the ouster ordinance was amended so the cars could come back. Immediately thereafter, on Dec. 5, service was restored, pending a permanent settlement of the controversy.

CARS CAME BACK ON DEC. 5

To be correct the railway resumed regular service at four o'clock on the afternoon of Dec. 5, twenty-eight days after the cars had been removed. The first car carrying passengers was cheered all along the street. Judge Killits, to whom the city had carried its case to require the company to resume service, acted as motor-man on the first car in from Toledo Beach, where the cars had been stored, and piloted it through the downtown district.

By Dec. 6 the company was operating 100 per cent of normal service, and as regards passengers handled that day proved to be the most successful in the history of the company. Since the resumption of service the passenger revenue has been greatly in excess of that at any time previous to the lay-off. All but a very



H. L. DOHERTY



F. R. COATES

few of the trainmen returned immediately to service and showed an earnest effort to co-operate in bringing service back to 100 per cent.

The modification of the ouster measure so that the cars could return was not brought about, however, without considerable acceleration from outside influences. In this work the business men of the city played a prominent part, for early in the first week of December they started a petition for the recall of the Mayor, and certain members of his Council. Before this had progressed far enough to have any influence on the situation, however, five councilmen, without the knowledge of the Mayor, got together and called a special meeting of the Council to amend the ouster ordinance as suggested by Judge Killits. This was done, and immediately the city asked to have the car service restored.

On Dec. 5 Judge Killits named two commissioners to help city and traction officials in drafting the proposed ordinances to be submitted to a popular vote. Either of these ordinances, if accepted, will permanently settle the controversy. As previously suggested by H. L. Doherty, a municipal ownership and a Tayler-plan franchise will be drafted. The court also ruled that these franchises must be ready to submit to the people by Jan. 15, 1920, or that the cars could again be removed from service. Until that time the fares are to remain at 6 cents with 2 cents for transfers, the fare in effect when the cars were removed from service.

As soon as the cars resumed service the 2500 jitney buses cut their fare from 10 cents to either 6 cents straight or in a few cases to 5 cents and a free transfer. The latter service, however, is most unsatisfactory, and none of the jitney service is looked upon by

the railway as offering serious competition to street-car service. Practically all touring cars have discontinued operation.

It is not expected that there will be any further important development in the Toledo situation until the two proposed franchises are submitted to the people on or before Jan. 15 next.

The electric railway situation in Toledo has been a source of dispute and a political football for many years. The past seven years have been especially turbulent and for the last two years some radical development has been imminent. The Toledo Railways & Light Company was incorporated in the State of Ohio on July 1, 1901, as a reorganization of the Toledo Traction Company, which the H. L. Doherty interests had acquired. On July 1, 1907, the property of the Toledo Gas, Electric & Heating Company was also acquired. Before the property was taken over by the Doherty interests there had been trouble between the former company and the city and this was inherited by the new organization.

F. R. Coates, the present operating head of the company, became president in 1911, at which time the franchises for various routes were expiring and negotiations were undertaken to renew them. The last of the franchises expired in January, 1914. At this time the fare was 5 cents with universal transfers, six tickets for 25 cents and 3-cent tickets for workmen good for



CARS STORED ON THE SEA BEACH LINE

two hours morning and evening. The city politicians insisted on a straight 3-cent fare despite the fact that their own figures showed that it cost more than this to carry a passenger.

In March, 1914, the City Council, under the present Mayor, Cornell Schreiber, who was then the City Solicitor, without notice or discussion passed an ordinance making fares 3 cents and advised the people to pay no more, promising that police protection would

be given the people if they would tender but 3 cents. The railway company put the case squarely up to the public by straightforward publicity methods and said that if the people did not wish to pay 5 cents they could ride free. In this manner trouble was avoided and nearly 80 per cent of the passengers paid a 5-cent fare. In September, 1914, in the Federal Court, the city was defeated in an attempt to force 3-cent fares and the 5-cent fare was restored.

COMPANY HAS HAD NO FRANCHISE SINCE 1914

Since January, 1914, the railway has been operating under a day-to-day franchise granted by the court, the city having the right to "oust" the company on twenty-four hours notice and the company having the same right to abandon operation. Late in 1914 the city railway committee began the drafting of a street railway franchise. A careful study was made of the Tayler



AN UNIQUE GROUP OF MEN WHO BROUGHT THE FIRST CAR BACK INTO TOLEDO

Left to right—Dewey C. Bailey, attorney for Mr. Doherty; Frank R. Coates, president of the company; Federal Judge John M. Killits; Cornell Schreiber, Mayor of Toledo; Chris Wall, director of safety of Toledo; James S. Martin, law director of Toledo; Dewitt Fisher, secretary to the Mayor; Charles A. Frueauff, legal adviser to Mr. Doherty.

franchise under which the Cleveland Railway was operating, and Mr. Doherty expressed his willingness to agree on a settlement regardless of the outstanding capitalization and bonded debt.

A proposed ordinance known as the Dotson ordinance was drafted and in this it was provided that the railways be operated at cost plus 6 per cent on the valuation. In order that the fare might be increased or decreased in units smaller than 1 cent it was provided that tickets could be purchased in certain quantities for certain amounts. This ordinance also provided for a commission to make a valuation of the property upon a

fairest ever drafted, it was lost at the election through the influence of these newspapers and the radicals.

When Mayor Milroy was elected in November, 1915, he named a street railway committee which consisted of the two editors of the opposition newspapers, a former president of a labor union, a lawyer who was a violent opponent of the Dotson ordinance and H. L. Doherty. The lawyer refused to serve with Mr. Doherty and in order to eliminate Mr. Doherty the committee appointed a street railway commission consisting of the other four members and invited Mr. Doherty to attend the meetings and give information.

Although the two editors who had opposed everything that had been done toward a settlement now had the opportunity to draft such an ordinance as in their opinion Toledo should have, the result, known as the "community plan," was so impracticable that nobody ever considered its adoption. This plan was the old device of "trusteeing" stock in order that new owners might acquire it. A new company was to be incorporated and the capital stock was to be trusteeed and placed on sale. A period of five years was given in which to sell the stock and any citizen might purchase. The money paid for the stock was to be used to buy the street railway, with the provision that the city might purchase from the new owners when it had the money. The proposed ordinance was filed with Mayor Schreiber, who was again in office, and he laid it away.

FARE INCREASE RESULTS IN OUSTER ORDINANCE

With constantly rising costs resulting from the war, the court in April, 1918, ordered a straight 5-cent fare and a charge of 1 cent for a transfer. In May, 1919, by mutual consent between the company and its employees, the question of higher wages was referred to the National War Labor Board. Large increases were granted and in June, 1919, the fare was increased to 6 cents with a charge of 2 cents for a transfer.

When the last fare increase was placed in effect Mayor Schreiber submitted to the Council an ordinance to "oust" the company from the streets. This passed the Council on June 30. In July the company submitted a proposed ordinance for operation at cost plus a percentage of the profits for the company, this being in effect the Tayler plan in use in Cleveland. In this proposed ordinance the city was given the right to purchase the property. This ordinance was shelved. The ouster ordinance would have become effective on July 31, but members of the local commerce club and other representative citizens initiated a petition for a referendum vote at the municipal election. This was held on Nov. 4, at which time the ordinance was passed by 800 votes out of a total of 39,000 cast. The city urged passage of the ordinance, saying that it would be a club over the railway.

The wording of the ordinance was as follows:

An Ordinance: Directing the Toledo Railways & Light Company to cease operating street cars in the City of Toledo and to remove from the streets of the City of Toledo all of its property devoted exclusively to street railway purposes.

Be it ordained by the Council of the City of Toledo:

Section 1. That the Toledo Railways & Light Company shall forthwith upon the taking effect of this ordinance cease operating street cars in the streets of the City of Toledo, and shall within a reasonable time remove from the streets of the City of Toledo all of its property devoted exclusively to street railway purposes.

Section 2. That the director of law shall secure the enforcement of this ordinance by appropriate legal proceedings.



JUDGE KILLITS, IN APPROPRIATE UNIFORM, AT THE CONTROLLER

fixed basis. When the fare was once fixed it was to prevail for five years and transfers were to be free.

It was popularly supposed at this time that Cleveland people were paying only a 3-cent fare and there was agitation in Toledo for the same rate. The Dotson ordinance provided for a try-out of this rate. For the first year the railway was to be completely under the management and direction of three city commissioners who were to control all property, moneys, records and operations and charge a fare of 3 cents with free transfers. During this first year the actual cost of operation was to be ascertained.

The proposed ordinance also provided that before the test began, improvements and extensions should be made and full equipment acquired by the company so that the test could be made under the best possible conditions. At the termination of the first probationary year the Council was to fix the fare for the first five-year period. Mr. Doherty announced publicly that the company was willing to accept this ordinance, although he thought the return to the stockholders should be 8 per cent.

PROPOSED ORDINANCE DEFEATED BY NEWSPAPERS

Two Toledo daily newspapers, notably the Scripps paper, had been bitterly attacking the railway and viciously opposed the ordinance. The ground of the opposition was that the people wanted municipal ownership and that the only way to get it was to defeat every proposed franchise. Although conservative people of Toledo believed this ordinance to be one of the best and

Section 3. This ordinance shall take effect and be in force from and after the earliest period allowed by law and shall be subject to amendment or repeal, expressly or by implication, at any time at the will of the Council.

No campaign of any sort was made by either side other than such matter as appeared editorially in the newspapers. It is frankly admitted by some citizens that they voted for the ouster not because they were unfriendly to the company but because they saw in such action the only means of taking the traction matter out of politics and having it settled once and forever. On the other hand, it is said that those who voted for it because of unfriendliness to the company did so because they had been influenced by the unfriendly newspapers and because they had been led to believe by the administration that a plausible substitute plan was ready to be put into effect. In reality it is believed that the administration intended to use the ordinance only as a club and did not expect the company to cease operation.

COMPANY OBEYS ORDER AND REMOVES CARS

It will be noticed from the foregoing quotation of the ordinance that the company was ordered to "forthwith . . . cease operating street cars." The official count of the vote was received at noon on Nov. 8. The company did not wish to inflict unnecessary hardship upon the public by leaving people stranded in the downtown district, so operated the cars the remainder of the day and at midnight, without further opposition to the mandate of the people, ran all the cars over the State line into Michigan.

The company was advised by its attorneys and by outside lawyers that if the cars were operated after the ouster was passed the company would be a trespasser on the streets and there would be no limit to the amount of damage that might accrue in case of personal injury suits. Also, by placing the cars in a neutral state, delivery could be more easily made in the event that the property had to be salvaged.

Upon learning that the cars had been withdrawn Mayor Schreiber charged that President Coates had broken faith with the city. Apparently this was an attempt to shift the blame. It is reported that the city officials were planning to prevent the company from removing the cars in order that the city might take possession and operate them. The city officials say that they did not expect the ouster to drive the cars out of the city but merely to compel the company to enter into a franchise upon terms dictated by the City Council. Someone evidently overlooked the meaning of "forthwith" but it was not the railway.

Immediately after withdrawal of the cars there was talk, at the city hall, of repealing the ordinance. It was decided that such a repeal, before becoming effective, would have to be ratified by a public vote. Meanwhile the company, having no further privileges on the city streets, was obliged to cancel its contracts with inter-urban lines entering Toledo over the city tracks and refused to permit further use of the tracks.

The majority of the reasonable, fair-minded people of Toledo did not censure the company for its action. The merchants, who are the heaviest losers by the lack of service, unanimously voted to ask the company not to put the cars back until a permanent settlement is reached. Mr. Doherty personally did everything possible to bring about a settlement. He agreed that if the Council would pass both the Cleveland type of franchise and a municipal-ownership franchise and would get the

sources of organized opposition to agree to vote "yes" on one or the other proposition when it came up for public vote, he would put the cars back in the interim until a vote of the people could be obtained.

In its desire for a settlement the city asked that the company lawyers meet the city lawyers to frame the two franchise ordinances, and this is now being done. In the meantime a valuation of the property is being made to help to defray the expenses, for which the company offered to put up \$25,000. The company meanwhile is said to be circulating a petition for a vote on a Talyer franchise plan so as to be prepared in case no agree-



"CLOSE-UP" OF JUDGE KILLITS AT HIS NOVEL OCCUPATION

ment is reached on either of the two franchise ordinances in question.

On Nov. 22 Mayor Schreiber introduced a motion before Federal Judge Killits for a mandatory order compelling the company to resume operation. This was based on the Miller law, passed last April and made effective in August. The Miller law provides that no public utility company shall abandon its lines or discontinue service without a hearing on the issue being held before the State Public Service Commission. The company and the commission both contended that the law did not apply to this case, inasmuch as the company has no franchise. Mr. Doherty announced that if Judge Killits issued the mandatory order he would carry the issue to the Supreme Court of the United States.

COURT SUGGESTS TEMPORARY SETTLEMENT

The case came before the court on Nov. 28. Judge Killits said he was ready to order the cars back to the streets immediately upon the formal order of Mayor Schreiber then in court, but he expressed the belief that the order of the Mayor lacked the sanction of the City Council. To this Mayor Schreiber declared he would call Council in special session. This the councilmen subsequently did themselves, but as a result of the suggestion of the court the purport of the meeting was changed and the ouster measure was amended so the cars could come back.

In his suggestion for operation of the cars immediately Judge Killits proposed to appoint a commission, composed of six or ten members, equally divided between adherents of municipal ownership and those favoring the Tayler service-at-cost plan. Under this plan, he said the cars could be operated at once as he would suggest appointing Frank R. Coates, president of the Toledo Railways & Light Company, operating head of the traction system, while the city officials and traction owners consider details of the franchise drafts they now are working upon. The plan proposed by Judge Killits was summarized at the time as follows:

1. Provides for resumption of car service at once, on temporary basis, if H. L. Doherty, Mayor Schreiber

9. Court reserves judgment as to what will be done further if one party accepts and other refuses to accept suggested plan.

10. Judge Killits expresses opinion court has power to order resumption of transportation, under Miller law, but says this or any other order would be subject to appeal and indefinite delay.

2500 UNBONDED JITNEYS IN OPERATION

While the cars were "on vacation" the chief mode of transportation in Toledo was the automobile, either in the form of the private car, the jitney bus or the taxicab. The city issued a call for buses and 2500 were soon in operation. Each bus was registered free, received a number and picked out a route. A fare of 10 cents without transfer privilege was charged. The routes were short, keeping to the good streets, and many outside districts were practically marooned. Definite routes were laid out, but a driver could take his choice and change routes as often as he pleased. No bond was required for registration, so that the only recourse in case of accident was a personal suit. Buses were prohibited from operating in certain busy thoroughfares and an attempt was made to loop the routes following the street car lines as closely as possible. An amendment to the ordinance permitting bus operation was passed compelling all buses to operate the full length of the route instead of turning back as soon as all of the passengers were discharged.

To reach their places of employment many persons had to use two or more buses, paying 10 cents on each and then ordinarily there was a walk at each end. An interview with the City Commissioner of Transportation disclosed the fact that he would not have been surprised to have the city without street railway transportation all winter. He expressed no dismay at the possibilities of early snow, however, and believes it would have had no ill effect on the buses. His contention was that instead of traffic being benefitted by the railway in keeping the tracks clear, it would find the streets more passable with an even layer of snow than with the condition in which the railway snow plows leave the roadway. That the buses had a problem before them is clear from the fact that the railway company was transporting about 200,000 passengers a day with approximately 400 cars.

BUSINESS HOUSES AND THEATERS SUFFERED

In addition to interviewing the railway company officials, the Mayor, the City Clerk and the Commissioner of Transportation, a representative of this paper interviewed the secretary of the Chamber of Commerce and the managers of several large department stores, theaters and hotels. The general attitude of the business man was found to be a belief that the lack of transportation had a very demoralizing effect upon business, not especially due to the added cost of the bus service but because of the inconvenience of travel. He desired to see the cars back on the streets but would rather sustain a temporary loss of business and have the cars remain out of service until a definite and final settlement could be made.

It seemed to be the general belief also that the company did the proper thing in removing the cars. Some public opinion among the lower classes was crystallized against the company by the action. Many people seemed to believe that the Council had some miraculous power by which it could provide a substitute for railway ser-

REFERENDUM PETITION

NOTICE:

It is a misdemeanor for anyone to sign any initiative or referendum petition with any name other than his own, or knowingly to sign his name more than once for the same measure, or to sign such petition when he is not a qualified elector.

All names must be signed in ink or indelible pencil and must be followed by the signer's place of residence, by street and number, ward and precinct.

To Albert W. Payne, Clerk of the Council of the City of Toledo, Lucas County, Ohio:

We, the undersigned, five duly qualified electors of the City of Toledo, Ohio, hereby designate ourselves as the proponents of the proposition of this petition and as the Committee in charge thereof:

Name	Residence
Alfred B. Koch	424 Wiothrop St.
Albert J. Neuhauser	2616 Perkwood Ave.
Albert J. Eggleston	747 Main St.
Frank M. Knierim	523 Bush St.
Dr. James A. Duncan	1167 Broadway

We, the undersigned qualified electors of the City of Toledo, Ohio, hereby present by referendum petition, for approval or rejection by the electors of the City of Toledo, Ohio, a certain ordinance adopted by the Council of the City of Toledo, Ohio, on the 30th day of June, 1919, and approved by the Mayor on the 10th day of July, 1919, a full and correct copy of the Title and Text of said Ordinance is as follows:

PART OF THE REFERENDUM PETITION

and Council accept court's suggestions for temporary and permanent settlement.

2. Requires Council first to pass emergency resolution, ratifying Mayor Schreiber's application for mandatory order for resumption of car service under Miller law.

3. Judge Killits then to begin operation of railway for sixty-day period, preserving company organization intact, and appointing President Frank R. Coates operating officer. Court to determine fare, schedules, rerouting.

4. For permanent settlement, Mayor and Council must agree to accept assistance of a commission, to be appointed by Judge Killits and approved by Mayor and Council.

5. Commission to consist of either six or ten members, divided equally between municipal ownership and Tayler plan advocates.

6. Commission, Mayor and Council to work out ordinances providing for both plans to be submitted to popular vote.

7. Acceptance of court's proposal by either party not to be deemed final until order is framed and submitted designating exactly how cars shall be operated temporarily.

8. If both city and company refuse to accept court's suggested order, Judge Killits may abandon further attempt to help.



WHEN THE CARS RETURN

(Cartoon from one of the local papers while the cars were on their "vacation" in Michigan)

vice. These people, because of a dislike for public utility companies in general voted for the ordinance without investigating to see what the result would be.

The out-of-town business of the stores was especially hard hit by the withdrawal of the interurban cars from the city streets. Toledo is the center of many interurban lines which brought in considerable business. During the traction famine the cars turned back at the city limits and only a few lines provided bus service to the downtown district. Some of the department stores reported a decrease of about one-third in gross business.

The moving-picture theaters suffered more than the "legitimate" houses. The former reported a loss of about 30 per cent in attendance. This was noticed more at the evening shows than in the afternoon. The "legitimate" theaters reported a loss of about 12 per cent in attendance the first week the cars were off with an increase to about 15 per cent later. Contrary to the experience of the moving-picture shows the attendance at the matinees showed the greater reduction. There are several reasons given for this, among them being that there are fewer shoppers down town during the day while the evening attendance is largely made up of persons who drive to the show in their own cars.

The withdrawal of the cars threw out of employment some 1100 of the railway's 1400 employees, the remaining 300 being used to guard the cars in storage and perform other necessary work. Many of the men thrown out of work secured temporary employment elsewhere and were within easy reach when the ouster ordinance was repealed. The ordinance did not foster a kindly feeling on the part of the members of the street railway union toward the city administration.

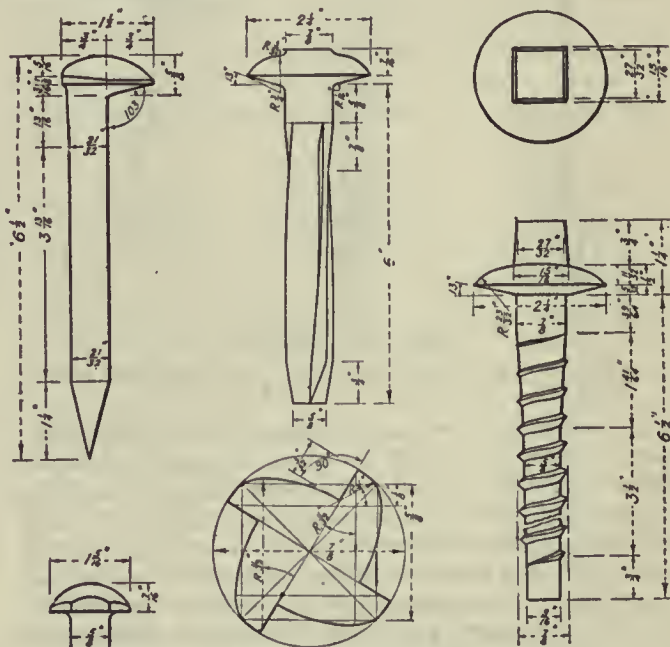
Fatigue of Metals

An investigation of fatigue phenomena in metals under repeated stress has just been started under the joint auspices of the National Research Council, Engineering Foundation and the Engineering Experiment Station of the University of Illinois. Plans are laid for a two-year program of tests, and it is hoped to secure data of various metals including results of a number of tests of each metal to 100,000,000 reversals of stress.

Tests on the Holding Power of Railroad Spikes

THAT there is room for much more extended study of the holding power of railroad spikes is indicated in the recent laboratory tests conducted by the civil engineering testing laboratories of Columbia University as reported upon in its Bulletin No. 1 recently published. The point is made in the report that the method of test used in the past appears to give erroneous results when checked with the more modern and accurate method used for these tests. Incidentally, some tests were made to cover resistance of the spikes to pull after redriving, which are perhaps as important as original pull tests because the former give data bearing upon actual track conditions where spikes pulled in service are redriven.

Three types of spikes are compared: A standard cut spike, a standard screw spike and a new design called the Sessler grip spike which is a quite radical departure from existing standards. All these are shown in the accompanying figure.



THREE TYPES OF SPIKE TESTED IN COLUMBIA UNIVERSITY LABORATORIES

The conclusions reached as the result of the tests so far made are as follows:

1. The tests outlined herein, although of limited extent, show conclusively that the rail fastenings tested act as elastic structures within certain limits depending upon the character of the wood and type of spike.
2. In the softer woods the elastic limit of the fastening is reached at very small withdrawals ranging from 0.004 to 0.006 in. In an oak tie these limits are higher.
3. Within the elastic range of the fastening the resistance developed by the fastening is directly proportional to the amount of withdrawal.
4. Small permanent withdrawals or sets have been recorded within the elastic range of the rail fastening but these are no greater than would be reasonably expected in a material such as wood.
5. A rail fastening to approach permanency must at no time be stressed beyond its elastic holding power, making due allowances for the fatigue and physical deterioration of the wood fibers during the life of the fastening.
6. In view of the importance of these facts to the railway profession a more complete investigation should be made definitely to establish the elastic behavior of various types of spikes, both without and with preformed holes of various sizes driven into deteriorated ties.

Voltage Surveys Give Information for Varying Station Voltage

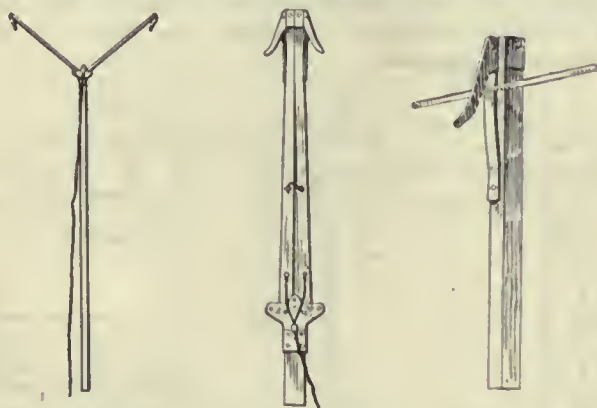
A Pole Which Can Be Quickly "Knocked Down" for Portability, Provided with Suitable Contacts, Is Convenient for Use in Making Voltage Readings

BY HARRY RESTOFSKI

West Penn Power Company, Connellsville, Pa.

IN THE operation of a large railway system it is frequently desirable at intervals to check the trolley voltage at various points. Such information is necessary in order that the location of feeders and feeder taps, and the station voltage may be adjusted to the changing needs of the system resulting from extensions or from load variations.

In making voltage surveys for these purposes the writer has found it convenient to use a standard three-section wooden pole made by the Western Electric Com-



END SECTION OF POLE FOR MAKING CONTACT WITH TROLLEY WIRE

At left end with spreaders extended. Center, end with spreaders closed. At right, method of clamping to the wire.

pany, primarily for use in connecting portable telephones to the line from ground. Details of the construction of this pole are shown in the accompanying illustration. The sections are approximately 6 ft. long and are connected by inserting the brass-tipped end of one section into the close fitting brass sleeve on the end of another. The arrangement for locking the sections together to prevent them from falling apart when hanging on the wire, are shown in a second illustration. Ordinarily, three sections are used but the middle section may be omitted where the entire length is not required.

The pole is equipped with 100 ft. of wire and with two hooks on which the wire is wound when not in use. The contact device gives a two-point contact and its



JOINTS OF POLE AND METHOD OF FASTENING

effectiveness is increased by the spring pressure when clamped to the wire. When knocked down, the pole can be taken readily into a street car and can be conveniently carried.

The method of establishing a ground connection varies with the location. If the readings are to be taken near a signal box the connection is made on the ground wire from the signal box. Where stranded bonds are accessible, two or three strands of the bond are cleaned and the ground connection made to these. Where it is

necessary to make readings along a paved street, and a signal box ground is not available, the ground connection can be made by wedging the wire tightly between the ends of two rails with a screwdriver. Care must be taken not to run the ground wire over the track as it would then have to be removed every time a car passes, while with proper precaution the ground wire can be left in position, and it is then only necessary to remove the pole from the trolley wire as a car passes.

The method which I have employed in making a voltage survey consists of taking readings at half-minute

RAILWAY VOLTAGE READINGS—UNIONTOWN

		September 25, 1917			
Time	Voltage	Time	Voltage	Time	Voltage
12:41	700	1:05	680	29	695
	695		675		695
42	690	06	680	30	680
	680		685		675
43	705	07	675	31	695
	705		690		700
44	700	08	690	32	675
	710	To Uptown	690		675
45	695	09	685	33	675
	700		670		700
46	700	10	680	34	695
	700	Work Car	690		685
47	695	11	685	35	675
	700		690		700
48	710	12	690	36	705
	700		700		675

intervals throughout a complete cycle for each particular part. The accompanying tables show a series of voltage readings which were taken at Uniontown on Sept. 25, 1917. Notations are made to show the time that cars passed in each direction. The voltage readings are averaged and the maximum and minimum voltage determined. This information, together with the place and date of readings, is copied in permanent form and filed. To make the records more convenient, a tabulation showing the date and place of the average, the maximum and minimum readings, and any additional information desired, is made on separate sheets, or on a card record where this type of system is employed.

Automobile Arranged to Operate on Steel Tracks

THE Missouri River & Bonne Terre Railroad is operating over its lines a Buick car which has been rearranged to run on the track rails. This is a standard-gage road and the automobile, as shown in the accom-



AUTOMOBILE CHANGED FOR RAILROAD USE

panying illustration, is provided with a pony truck at the front and a single pair of driving wheels in the rear. The car as reconstructed weighs 5800 lb. and it is stated to be capable of making 12.8 miles on a gallon of gasoline. John Kehrman, master mechanic of the railway fitted up the car.

N. Y. E. R. A. Holds Fall Meeting

Higher Fares, Automatic Substations, Safety Cars, and Auto Bus and Truck Competition
Were the Subjects Discussed at New York City Meeting Held on Dec. 10

THE fall meeting of the New York Electric Railway Association was held at the Hotel Astor, New York City, on Dec. 10, with President E. A. Maher in the chair. Major Gardner F. Wells read a paper on "The One-Man Safety Car," which is abstracted elsewhere in this issue. Following the reading of the paper the motion picture prepared by manufacturers of safety cars and equipment, which was shown at the Atlantic City convention, was demonstrated by C. H. Beck, Safety Car Devices Company, who explained the history of the film and stated that the American Association has made arrangement for its use by interested companies.¹

J. S. McWhirter, Third Avenue Railway, New York City, then described the one-man or "auto" type of car with pedal control which is used at several points on the Third Avenue System.² Some of the cars have been operating more than eighteen months. The company now has twenty-five single-truck and twenty-five double-truck cars of this type in operation, and the management has authorized the conversion of seventy-five additional cars which will be put into service in a few months. Thirty of these will be double-truck cars arranged for one-man or two-man operation. The cost of converting a double-end car for pedal operation is less than \$250. One feature of the car is that the operator's duties are very simple and he can be taught the details of the control devices in a very few minutes. Mr. McWhirter emphasized the fact that this is not a make-shift device of the type that has been condemned in some quarters. As a general proposition he favored the one-man car, which he said will take care of most operating conditions in practically all cities.

G. M. Wood, Westinghouse Electric & Manufacturing Company, then spoke of the emphasis that should be placed on the increase in receipts produced by the safety car due to decrease in headways. Although introduction of these cars sometimes increases expenses, receipts increase more rapidly because more cars are used.

J. C. Thirlwall, General Electric Company, was the next speaker, and he reiterated the statement of Mr. Wood as to the increase in receipts. His principal point was as to the wide-reaching effect of weight reduction. He said that it has been the custom to assume that a reduction in weight of 1 lb. will save 5 cents per annum in operating cost. This was true some years ago of cars in practically continuous service, but not of tripper cars. Now, the figure should be about 10 cents to cover power and track maintenance costs. As an example of savings due to weight, Mr. Thirlwall cited the case of a road using 20-ton cars with energy costing 1.4 cents per kilowatt-hour, where the average energy cost was 6.55 cents per car-mile, without heat, or say, \$3,500 per year. This case would require safety cars in the ratio of three to two as compared with the older cars, but these three would weigh 16 tons less than the other two.

J. H. Ohlsson, The J. G. Brill Company, said that the first safety cars were too light and that in their use it had been a mistake to put a limitation upon the number of passengers. The cars are now being built to meet transportation requirements, and a weight of about 7½ tons is standard. It should not be much more than that, certainly not more than 8 tons. The Brill Company and its subsidiaries have to date built or are building a total of 1700 safety cars.

Referring to the subject of track maintenance on lines equipped with safety cars, R. C. Cram, Brooklyn Rapid Transit System, pointed out that it is very difficult to make any definite statement as to these costs. Very few companies, he said, know what it costs to maintain tracks with any kind of equipment. This fact must be kept in mind in weighing the merits of any claims as to reduction in track maintenance cost, and the live question before the way engineers now is as to how light track can safely be built for use under safety cars.

At this point the chairman, on behalf of W. G. Gove, Brooklyn Rapid Transit System, extended an invitation for the members of the association to visit Brooklyn and see the new safety cars in operation. He also said that the pedal-control car, described by Mr. McWhirter, could be seen at the shops of the Third Avenue Railway.

The second paper was one entitled "Automatic Substations," which was read by the author, C. L. Cadle, chief engineer New York State Railways, Rochester, N. Y. This paper is abstracted elsewhere. The discussion upon it was opened by G. H. Roosevelt, General Electric Company, who expressed appreciation for the data which Mr. Cadle gave. He said that it had been customary to assume that automatic control equipment would pay for itself in two and one-half years. This would seem to be conservative in the light of the cost figures given, especially under present labor charges. In paying for itself the automatic substation makes the greatest saving in labor, but there is also a saving of some 5 to 6 per cent in energy consumption.

Taking up the subject of interruptions in service, Mr. Roosevelt said that the causes of these have gradually been eliminated. Sometimes interruptions had resulted from over-confidence on the part of the operators. They must realize that an automatic substation is not a manual one made foolproof, and high-grade inspection is absolutely necessary. Relays are sensitive pieces of apparatus, but they can be kept in good condition without great difficulty by skilled maintainers. There are in the automatic substations but three relays that will keep it off the line and these operate only under conditions which might prove disastrous to the substation apparatus. Some purchasers of automatic substations have insisted that hand-operated circuit breakers of the older type be included as an extra safeguard. This is not necessary, and if installed they must not be considered a part of the automatic equipment.

Mr. Roosevelt showed that the greatest economy in applying automatic substations results when they are

¹An article describing this film appeared in the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 27, 1919, page 667.

²See ELECTRIC RAILWAY JOURNAL, May 18, 1918, page 977, and Aug. 10, 1918, page 249.

used on a system in which the "center of gravity" of the load is changing. This is due to their flexibility, because it costs very little more to distribute rotary converters over a system than to concentrate them in a few substations when automatic control is used.

The discussion was concluded by T. R. Langan, Westinghouse Electric & Manufacturing Company. He said that many people cannot believe the automatic equipment capable of doing what it really can do. However, it is "not too good to be true," and the present rapid introduction of the automatic telephone shows how reliable labor-eliminating devices can be made. The automatic substation affords an excellent means for reducing the amount of overhead copper necessary to maintain good voltage distribution. A wonderful thing about this equipment is the speed with which a rotary can be put back on the line, the time required being only from six to seven seconds, whereas with manual operation from one to two minutes may be required. Mr. Langan backed up the previous speaker as to the importance of high-grade maintenance, and the labor saving made possible with the new equipment.

After the conclusion of the discussion on automatic substations the association adjourned for lunch, which was served in buffet style.

INCREASED FARES AND AUTO TRUCK COMPETITION

The afternoon session was devoted to the presentation and discussion of a paper by Harlow C. Clark, editor of *Aera*, on "Fare Increases in New York State" and one by C. L. Stone, vice-president and general manager Southern New York Power & Railway Corporation, on "Competition with Motor Vehicles." Mr. Clark's paper will be printed later. Abstracts of Mr. Stone's paper and three others contributed to the discussion are published in this issue.

After these papers had been presented, President Maher suggested that it would be interesting to hear something from the "other side," and asked Carl E. Lang, president Lang-Warden Motors, Inc., to give his views on motor trucks as a competitor to electric freight.

Mr. Lang said he realized that railway men think the motor bus is a pest, but he believed, and others who had studied the subject from the motor bus standpoint also believed, that it was here to stay. He did not believe in irresponsible individual operation, such as had been described, but where the motor bus was put in service as a merchandise proposition it would be profitable, both in passenger and freight service. Logically, the railway men should operate such lines because they have the organization to conduct them, as well as expert knowledge of transportation.

B. E. Wilson, general freight and passenger agent, New York State Railways, Rochester Lines, said the difficulty arose from the fact that "a sucker was born every minute," and that irresponsible individuals would engage in the motor-truck freight business with the expectation of making a profit, but would be unable to do so.

Myles B. Lambert, Westinghouse Electric & Manufacturing Company, emphasized especially the expense and the time required to pass freight through railway terminals. This made the auto truck useful for short-haul business, and this was its especial province. He said he had attended the Central Electric Railway convention at Grand Rapids, where the same subject was discussed. The principal conclusions there reached were: First,

that the railways should make a scientific study of methods for reducing operating costs, and second, that they should give publicity to the advantages of their service and the burdens under which they were working. If the auto trucks should carry the same burdens, they would cease to be active competitors for the longer haul business.

C. E. Morgan, assistant general manager Brooklyn City Railroad, also urged scientific study of the cost of operation and adjustment of the service to the needs of the traffic so as to save unnecessary mileage and light loads. The field for the auto bus, in his opinion, was as feeders for the electric railways, and he thought that there was room for both car and truck, if co-operation in service could be arranged. He cited some of the long through hauls conducted in Central Electric Railway territory.

W. Tuke Robson, formerly general manager and engineer Southampton Corporation Tramways, England, said that the British electric railways had not engaged in the freight business, but that many of them operated motor buses in co-operation with their cars in passenger business. The buses were used in three ways. First, to operate as extensions from tramway termini and so to act as feeders; second, for crosstown or cross-country lines, and third, to test out the traffic on proposed tramway routes to determine whether it was worth while to lay rails. He thought that there would be considerable development of the motor bus business in Great Britain in the next few years by tramways, particularly in the way last mentioned, because of the high cost of tramway construction at present. He also spoke about the way in which the British tramways catered to the short-haul traffic, as a result of which there are no jitneys in England. In America he thought the short-haul rider was discriminated against, not only in fares, but through paucity of destination signs and directions as to what point on the street he should board a car and by what platform door. In fact, by the time the stranger discovered the door by which he was supposed to enter the car it would be shut in his face and the car would be in motion.

At the close of this discussion President Maher announced that the annual banquet would be held at 7:30 p. m.

Interesting Speeches at Banquet

THE dinner in the evening was held in the roof garden of the Hotel Astor, and President E. A. Maher, Jr., acted as toastmaster. There were three speakers. The first was a well-known entertainer in New York who was introduced under the name of "Senator Edward Ford of Wisconsin." The next speaker was Senator Charles S. Thomas of Colorado, who declared that the regulation of rates which did not include regulation as to expenditures would result in disaster. The greater part of his speech, however, was devoted to the labor situation, in which he thought the radical tendency should be corrected by legislation supported by a united public opinion. He said that the total number of strikers between the declaration of war by this country and the armistice, a period when there was supposed to be no strikes, was more than 2,000,000, and that the present discontent in labor was interfering greatly with production. He questioned whether combinations of labor should not be subject to legal restraints similar to those of capital, and said

that he had reason to believe that much of the financing of recent strikes had come from Russia by way of Mexico.

The final speaker was Public Service Commissioner Lewis Nixon, who was introduced by the toastmaster as a man "whose mind and spine synchronized." At the opening of his speech Mr. Nixon, in commenting on a remark by Senator Thomas that the whole world was in a state of flux and change, said that he could show the Senator in New York a man with a most unchangeable mind. Speaking directly on the traction situation, he said that he had made every effort to get the city and railways to adjust their difference, but that the former had shown no disposition to do so. He proposed, however, to see the matter through and that he would naturally want to see it through to a solution as soon as possible. He said that the concessions which the companies had expressed themselves as willing to make were "almost unbelievable." He quoted the present situation in Toledo as an example of the dependence of a city on good transportation. In a visit there during the absence of street cars he had found the jitneys and buses were charging from 10 cents to 50 cents a ride and the whole city was in a state of demoralization. The merchants reported that their sales had fallen off not less than 50 per cent. In conclusion Mr. Nixon discussed fuel conservation.

Competition from Motor Vehicles*

Owners of Motor Vehicles Carrying Persons or Property for Hire Should Be Subject to the Regulations of Other Common Carriers

BY C. L. STONE

Vice-President and General Manager Southern New York Power & Railway Corporation, Cooperstown, N. Y.

WHEN a motor vehicle is owned or operated for the purpose of transporting persons or property for compensation it is perfectly plain that it should become a "common carrier," and as such it should be subject to laws and regulations similar to those which govern other common carriers within the State.

Public service commissions have been established for the purpose of regulating public utilities. The early plan of encouraging competition, in the end brought hardships upon the communities served by dual systems. It is now generally admitted that one strong lighting company, for example, will serve a community to better advantage than two systems. At present, motor vehicles transporting passengers and property for compensation are operated over the public highways in this State with practically no regulation and without paying anything like a fair license fee to compensate for the wear and tear of highways occasioned by the operation of these motor vehicles. To aggravate the situation from our standpoint, the taxes of the electric railways have been heavily increased during the past few years, and these funds have been used in part to build and maintain improved highways over which our competitors operate.

There is some regulation of motor vehicles transporting passengers for hire within New York State, but there is no provision in our existing laws for the Public Service Commission to regulate motor vehicles transporting freight for hire.

There was an amendment made to the transporta-

tion corporation laws on May 3, 1919, wherein it was provided that villages and towns may elect to place themselves under the provision of the transportation corporation law, and thereupon it would become necessary for motor vehicles carrying passengers for hire to obtain a consent from the local authorities before operating over the streets in the village or town, and in addition to this consent the owner or operator of the motor vehicle must procure a certificate of public necessity from the Public Service Commission. This amendment is a step in the right direction to protect electric and steam railroads from passenger bus competition, but it does not go far enough because it is often difficult to get village boards and town boards to place themselves under the provision of the transportation corporation law, and even if one set of officials does pass a resolution to this effect a succeeding village or town board could pass a resolution which would nullify the act of their predecessors.

A few years ago, a number of states and municipalities enacted so called "jitney" laws, but very little attention has been given to the protection of electric railways from competition with motor vehicles carrying both passengers and property, when these motor vehicles are operated outside the limits of cities. This statement applies not only to New York State but also to Pennsylvania, Massachusetts, Ohio, Indiana, Illinois, Wisconsin, California, Georgia and Washington, D.C.

The public service company law of Pennsylvania apparently regulates the operation of motor vehicles on public highways to a greater extent than any other public service company law which I have found, and a law in New York similar to the Pennsylvania law would be highly desirable. This Pennsylvania law, in the first place, defines clearly that the term "public service company" when used in the act, includes all railroad corporations, canal corporations, street railway corporations, stage line corporations, express corporations, baggage transfer corporations, pipe line corporations, ferry corporations, common carriers, etc., and the term common carrier, as used in the act, includes any and all common carriers, whether corporations or persons, engaged for profit in the conveyance of passengers or property, or both, between points within the State of Pennsylvania, by, through, over, above or under land or water, or both. In the second place, no public service company can lawfully begin operation until it has obtained a certificate of public convenience from the Public Service Commission.

To ascertain as definitely as possible the facts in regard to the practical application of this law I have written to the officers of several of the large electric interurbans in Pennsylvania and also to the counsel for the Public Service Commission.

One of the questions asked was: "Can owners or operators of motor vehicles transporting passengers or property or both passengers and property for hire within the State of Pennsylvania secure from the Public Service Commission a certificate of public convenience and necessity if the proposed route parallels an electric railroad, assuming that the electric railroad can prove it is providing good service?"

C. L. S. Tingley, vice-president American Railways Company, answered this question as follows: "The Public Service Commission will not grant a certificate of public convenience and necessity for the operation of motor vehicles except for fixed routes and upon fixed schedules. Schedules of runs and tariffs of rates

*Abstract of paper presented at quarterly meeting of the New York Electric Railway Association, New York, Dec. 10, 1919.

have to be filed with the commission, and it will not grant such certificate where the route parallels an electric railway, if the electric railway is giving reasonable, adequate and sufficient service."

A question asked of the counsel for the Public Service Commission of Pennsylvania was: "Take, for example, an auto freight truck (large moving vans, etc.) engaged in transporting property for hire. The owner or operator "will transport anything anywhere" i.e., there is no prescribed route or schedule. Is it necessary for owner or operator of truck to secure a certificate of public convenience and necessity before beginning operation?"

This question was answered by E. M. Vale, chief of bureau of public convenience, as follows: "Under the public service company law any person, partnership or corporation engaging in the business of a common carrier must secure this commission's approval before possessing a lawful right to engage in such business. It is not necessary that the business be conducted over a prescribed route or upon a schedule. If the business transacted is that of a common carrier, the commission's approval must be obtained. The question as to whether the operation is between fixed termini and over a prescribed route is not material. The only question is whether or not the proposed business is that of a common carrier."

There has been a tremendous increase in the use of motor vehicles in New York State during the past few years.

In 1914, there were 17,193 commercial vehicles registered. During the first nine months of 1919, there were 88,051 commercial vehicles registered. This is an increase of 5 to 1, and 1919 is not complete. In 1914 there were 152,773 motor vehicles, in addition to the 17,193 commercial vehicles above. During the first nine months of 1919 there were 445,518 motor vehicles, in addition to the 88,051 commercial vehicles mentioned above. This is an increase of 3 to 1 during the first nine months of 1919, as compared with twelve months of 1914.

CONCLUSIONS STATED

Some of our government officials realize that the state, counties and towns, in the building of improved highways, are furnishing the owners and operators of motor vehicles engaged in transporting passengers and property for hire with the bulk of their plant. These owners and operators of motor vehicles are engaged in the transportation business in competition with existing carriers. They should be subject to the same regulations as steam and electric railroads, which, to date, are the only carriers which provide transportation for the public twelve months in the year. Furthermore, wherever a motor vehicle is engaged in transporting passengers or property for hire, the license fee should be adequate to cover not only wear and tear and depreciation of highway but a fair portion of fixed charges on the cost of the improved highways used by the motor vehicles.

There should be a law in the State of New York which will clearly designate all motor vehicles engaged in transporting passengers and property for compensation over public highways as "common carriers," and as such it should be compulsory for the owner or operator of these motor vehicles to obtain from the Public Service Commission a certificate of public necessity before these motor vehicles are operated over any public highways.

Motor Trucks and Electric Road*

Pick-Up-and-Deliver System Approved—Other Suggestions Made for Competing with the Motor Truck

BY F. W. WATTS

General Express Agent New York State Railways, Syracuse Lines

THE future of the freight and express business on electric railways depends upon the service that the companies can render. To secure more traffic, it is necessary to give better service than the motor trucks. This involves a pick-up-and-deliver service in cities and large towns, centrally located terminals large enough to care for all the business that is offered, efficient facilities for the prompt and economic handling of freight, courteous treatment to all patrons and prompt adjustment of claims for loss and damage. These factors should not be lost sight of.

Large shippers with a knowledge of traffic conditions favor giving their business to railway companies for the reason that they are responsible for loss and damage, that they operate their cars daily on schedule time and that the service in all ways can be depended upon.

About a year ago we were about to abandon our pick-up-and-deliver service because of the large number of motor trucks operating in our territory. Our general manager, who did not take kindly to the idea, advised that we separate the freight from the express business and ascertain what kind of service our patrons desired. New tariffs were made and filed, rates were advanced on the express service and a complete record of the operations was kept, and for the past nine months when trucks have had no difficulty in operating the report shows that 65 per cent of the total business has been pick-up-and-deliver service and that this service has yielded a profit even when every item of cost including depreciation is charged against it.

It appears to me to be the opportune time to campaign for less than carload business by electric lines. There is also a splendid opportunity for motor trucks to act as feeders for street railways in territories not covered by an electric line. As an example, we are now handling freight in connection with several truck lines operating in territory not covered by electric lines from Utica, and the service rendered is better than can be given by the steam roads.

The electric express and freight business has many warm supporters who may be depended upon to aid in securing necessary legislation to regulate the dangerous and unfair competition provided by motor trucks. It is of no benefit to electric railway carriers to have an individual decide to operate a motor truck parallel to the rail line, carry traffic at unremunerative rates, and then become bankrupt.

Another very unfair condition is that the truck operator can choose his traffic. If the consignee is in a remote part of a village, perhaps upon a hill entailing a long, hard trip for the truck, the operator decides that he does not want it and leaves that for the electric line.

Despite the competition to which we have been subjected our business has held its own, and while the tonnage transported is not as large as in former years the net revenue has been greater due to the better class of traffic carried.

*Abstract of paper presented at quarterly meeting of New York Electric Railway Association, New York, Dec. 10, 1919.

I would like to suggest the possibility of joint advertising on the part of all of the lines of the State to bring the superiority of the electric service to the attention of the shipping and receiving public.

Motor Truck Competition*

A Discussion of How It May Be Met—Three Things That the Railways Must Do

BY W. J. WHITESIDE

Traffic Agent, International Railway, Buffalo

MOTOR TRUCK service competition may be considered as of two classes: That operated to transport merchandise from one place to another for the benefit of the owner (usually a manufacturer or merchant), and that for revenue only, or designed to transport merchandise for others, a charge being made for such service.

In western New York State both classes of motor truck service have been increasing to an alarming extent, and the competition caused thereby has entailed a loss of large tonnage to the electric lines' freight service and a corresponding loss of revenue; and although considerable thought has been given by electric line operators as to what could be done to overcome this strong truck competition nothing of a definite nature has been accomplished.

It has been said "the motor truck operator for revenue only" cannot make it pay and will be compelled in time to quit. This, to my mind, is a big mistake, at least between short-haul points where the owner is favored in two ways: (1) By actively soliciting new business in the territory served and limiting the number of privately owned trucks for personal use and benefit, thereby securing full tonnage between short-haul points at all times; and, (2) being favored with good roads, seasonable weather and other conditions to permit regular daily truck service between the points covered.

I have found in the Buffalo territory that a 5-ton truck can operate at the same rate as charged by the electric line between short-haul points and make a good profit. For example, between Buffalo and the fruit belt of Lake Ontario, the truck would pick up a shipment at the packing house on a farm, haul it to the commission merchant's place of business in Buffalo, charging the same rate per 100 lb. as the electric line, with two handlings of the shipment, as against the farmer delivering the shipment to the freight house of the electric line, where it is loaded in a freight car, transported to Buffalo and transferred to a carting truck for delivery to the commission merchant's place of business, making four handlings of the shipment. The cost of operation and net return for one round trip per day, the truck capacity being 5 tons, is as follows:

Gross revenue, 10,000 lb. at 30 cents per 100 lb.....	\$30.00
Cost of Operation:	
One chauffeur	\$5.00
One helper	4.00
Gas and oil	5.00
Depreciation	5.00
	19.00
Net profit	\$11.00

Where the chauffeur is the owner of the truck, his daily earning would be \$16. These figures were furnished to me by an automobile operator and he fixed the cost at a conservative figure. However, the depre-

ciation of \$5 per day is too high. Trucks of 1½-ton and 3½-ton capacity can also operate with profit, based on the same cost with the wage of helper eliminated.

At the present there are now operating between Buffalo and Lockport six trucks; between Buffalo and Erie, Pa., two trucks; Buffalo and Rochester, N. Y., five trucks; Buffalo and Jamestown, N. Y., one truck, and between Buffalo and Cleveland, Ohio, with a transfer at Erie, Pa., one truck, while between Buffalo and Niagara Falls, N. Y., where no electric line freight service is being operated, there are seventeen trucks. While on these various routes the schedules are not all daily, still the volume of traffic by truck is sufficient to take away from the electric lines tonnage of large amounts. Practically all trucks operated are of the 1½- to 5-ton capacity. These trucks are owned by motor truck operators for revenue only, and this service is augmented by trucks privately owned.

Manufacturers who have one or more trucks for use locally often figure that if shipments must be delivered to and received from the freight house of the electric line, they can make deliveries and receive shipments for themselves between short-haul points without inconvenience and delay, and in this way save freight charges as well as carting charges. As the number of such personally owned trucks is increasing, the electric lines are further menaced in the operation of freight service by decreased tonnage and revenue.

The motor truck service for long hauls, while it is and has been quite a factor in competition, is operated almost exclusively by the "motor truck for revenue only operators" and at the start dazzles the operator with its possibilities of great return, but sooner or later the halo of great return fades away, and the operator finds himself possessed of worn-out trucks and empty pockets and discontinues the service on account of poor return. This, I believe, is caused by lack of full tonnage on all long-haul trips, length of time in making trips, maintenance of trucks and delays caused by bad road conditions, weather and other factors, so that the patron of the truck becomes dissatisfied and either purchases his own truck or avails himself of the electric line freight service. The personally-owned truck does not figure very strongly in the long-haul service because it would mean the loss of the use of the truck locally for extended periods, and with large concerns the truck cannot be spared for practically the greater part of a day to save freight charges of the electric lines.

While operators of motor trucks "for revenue only" may lose money and discontinue, there will always remain the truck owner who thinks there is a fortune in the business and start service, believing he can make it pay, and in this way continues the competition which menaces the electric line freight service.

Remedies are badly needed, and from a freight agent's point of view, three plans are worth consideration:

1. *Solicitation of Business.* Electric lines should have live, soliciting freight agents, capable of meeting the shipper in such a manner that by putting before him the frequent service offered by the company, the reasonableness of the rates for the class of service operated and the responsibility of the company in the payment of just claims as against service offered by the truck operator, who in almost every case is irresponsible when it comes to paying loss or damage claims.

2. *Prompt Payment of Claims.* Where claims are

*Abstract of paper read at quarterly meeting of New York Electric Railway Association, New York, Dec. 10, 1919.

legitimate, payment should not be delayed, as otherwise the business of the shipper or consignee making the claim is likely to be lost to the company.

3. *The Maintenance of Schedules.* Shippers and consignees soon learn when shipments should go forward and arrive at destinations, and if schedules are not maintained, the consignees become dissatisfied and purchase their own truck or turn to some other transportation service.

I feel that the electric and steam lines are entitled to some relief and protection to their freight service against motor truck service, and that the cost of building state and country roads should be paid, in part at least, by motor truck owners according to the tonnage of the truck operated, and that motor trucks operated for revenue should be subject to the jurisdiction of the Public Service Commission of the State as to rates and schedules, and that they be financially responsible to shippers as to payment of any claims.

Handling the Freight Business*

Promotion of Business, Motor Trucks in Relation to Traffic, Freight Claims, Billing and Reporting Freight, and Cost at Terminal Stations

BY H. C. STANTON

General Freight and Passenger Agent, Rochester & Syracuse Railroad

AN ACTIVE traffic manager is a most valuable asset in the traffic organization, for he will not only look after the development of freight business but will also see that there is adequate service properly to handle the business after it is once acquired. A good solicitor in the traffic organization is of valuable assistance, for he can acquaint shippers with the service and rates.

Electric railways are in a position to give service superior to that of their competitors, but many have failed to convince the public that the electric freight service excels other means of transportation. The most profitable service is carload business, but some electric lines are so situated that they cannot develop this traffic on account of paralleling steam lines. Therefore, their only revenue is derived from l.c.l. business which is the most expensive to handle. To secure and handle freight business, proper facilities are necessary, and also it is necessary to have and keep the confidence of the shipper. The fast and frequent service which electric railways furnish is worth a slight increase in rates over those of the steam roads.

I am a great believer in personal solicitation. We have a solicitor on the road who is constantly acquainting shippers with our service and rates. We do very little newspaper advertising for we believe, and our experience has proved that circular letters addressed directly to the traffic manager or the shipper are most effective.

We have on file in the traffic department a card index of all shippers and consignees on the line, giving names of persons in charge of freight traffic, which enables us to address letters direct to traffic managers and others in charge. It is our policy to keep patrons informed by means of circular letters regarding every new situation that arises. We also furnish all the principal shippers with copies of our freight tariffs and schedules.

We have joint rates with all electric lines west of Syracuse, and this enables us to accept shipments for points west as far as Buffalo. We have also developed a large tonnage during the past two years by accepting shipments for Detroit and Cleveland, transferring at Buffalo to water lines in the summer months and to steam lines in the winter months. Electric freight can be handled most economically at night. Early morning deliveries are the feature of the electric freight service.

We often hear that motor trucks are unfair competitors of the electric railways in the handling of freight. In my experience this is not entirely true as there are thirty-three trucks operating in and out of Syracuse, with which our company is co-operating. They are delivering some freight to us for points which they do not reach, and we in turn are delivering freight to them for points not located on our line. In other words, we are using them as auxiliaries to our service.

SETTLEMENT OF FREIGHT CLAIMS

The freight claim problem has become a serious one due principally to the following: (1) Theft of packages from cars and stations and abstractions from packages; (2) delivery of stray freight without due protection against claims for its value; (3) accepting packages not fully marked with name of consignee and destination.

I will give a brief outline of the method of handling freight claims on our line.

When a claim is presented our claim department acknowledges its receipt by a postal card, giving the claim number and requesting that future correspondence should refer to number given. After the claim has been acknowledged it is recorded on a card index, and the claim is placed on file in a separate folder under the file number given, and all correspondence in relation thereto is placed in this folder. In most cases when claims are presented, our investigation is complete for the following reasons: Our agents issue an O. S. & D. report for all "over, short and damaged" freight received at their stations. This report is then immediately sent to the forwarding agent for investigation. After the forwarding agent gives his statement, the report is sent to our claim department. On each freight car we have a traveling freight agent who sends our claim department a report of all freight over, short or damaged on his run. If no freight is over, short or damaged on his run, he makes a report with the notation "nothing to report" so that when these reports are received the investigation is complete, making an early settlement of claims possible. Prompt settlement of claims makes satisfied patrons and promotes business.

In addition to the investigation by agents, we have a special officer who receives direct information from the agents of all shortages and immediately starts personal investigation. In this way many claims are avoided.

BILLING AND REPORTING FREIGHT AND COST OF HANDLING AT TERMINAL STATIONS

I would like to bring up for discussion the method of billing and reporting freight and also the cost of handling freight at terminal stations. Various methods are employed. At present we are using the blanket way-bill and the received and forwarded register and by the use of carbon paper we make a copy of the way-bills received and forwarded at the same time that the

*Abstract of paper presented at meeting of New York Electric Railway Association, New York, Dec. 10, 1919.

register is made up. Some electric railways are using the individual way-bill, making the freight bill and the copy for the cashier, auditor and forwarding agent at one time.

At our Rochester freight station we handled during the month of November, 4,801,575 lb., or 2401 tons, with a force of eight day and seven night employees with a payroll of \$1,302.03 at a cost of \$0.542 per ton, and at our Syracuse freight station we handled for the same month, 5,389,063 lb., or 2694 tons, with eleven day and two night employees, with a payroll of \$1,136.63 or at a cost of \$0.422 per ton.

I should like to get the benefit of the experience of other companies in handling these matters.

Some Safety Car Objections Answered*

Operating Data from Widely-Scattered Points Refute Criticisms as to Inapplicability of One-Man Car for One Reason and Another

BY GARDNER F. WELLS

Consulting Engineer, New York City

MY FIRST experience with the one-man car dates back to the seventies. This was in Los Angeles, which at the time had a population of about 7,000. The cars seated ten or twelve people each and the motive power was one mule.

My attention was next called to the one-man car in 1915, at Fort Worth, Tex. One day the manager of the local street railway stated that a company had been organized to operate about twenty-five jitneys in competition with the street cars. The next day they began operation and at the end of two weeks there were more than 200 of them. At the end of a month the railway was losing about \$2,000 per day.

It happened that C. O. Birney was in town at the time, and he advised the railway management to build some light-weight cars for one-man operation and to give frequent service with them. Mr. Birney was soon given the opportunity by Stone & Webster, the Brill Company and the General Electric and Westinghouse Companies to develop his idea. Today the Northern Texas Traction Company at Fort Worth is operating practically all city lines with safety cars. The company operates two interurban lines, but the city lines produce about 60 per cent of the gross receipts. Due to the good car service and regulation of the jitneys by the city the latter have practically disappeared. The company is prosperous, as is shown by the accompanying figures.

For the year ending September 30, 1919, the earnings and expenses were as follows:

Gross earnings.....	\$3,093,226
Operating expenses and taxes.....	2,022,830
Net earnings.....	\$1,070,395
Income from other sources.....	115,000
Balance.....	\$1,185,395
Interest charges.....	299,995
Balance for reserves, replacements and dividends..	\$885,400

Thus the company is earning nearly four times its interest charges. The preferred and common stocks amount to \$7,150,000 and after deducting interest

charges there was left a sufficient amount to pay a reasonable return on them and to leave a balance more than enough to take care of all depreciation.

During 1917 the United States Housing Corporation financed the building of a number of safety cars for electric railway companies that served certain war industries. Among these was the Connecticut Company, in connection with which safety cars were introduced in Bridgeport on Feb. 2, 1919. The Oak Street-South Park line was completely equipped with them, requiring nine cars, replacing four double-truck cars which had been operated for a part of the day and five for a part. A ten and twelve-minute service was given with the large cars, whereas a five-minute service is now being given. The riding on the line has increased more than 100 per cent. The earnings per car-mile are about 30 cents, while total operating expenses and taxes amount to about 18.5 cents. The company is now planning to extend the use of safety cars as rapidly as is practicable.

That the cars have been well received by the public is evidenced by the following, from the Bridgeport *Herald*:

When the Connecticut Company first announced that it was to put into use the one-man trolley system on the streets of Bridgeport there were some pessimistic individuals who claimed that the idea was not practical in the Park City owing to the crowded condition of the streets and the traffic congestion.

Last Saturday the one-man trolleys made their first appearance and a week ago they started running regularly on the Oak Street-South Park lines.

People now have had time to judge the value of these cars. Traffic officers state that traffic is easier to manage than it was with the big cars, and the general public seems to feel that it is getting more frequent and better service despite the fact that the cars have not been put on all lines.

The police who do traffic duty point out the fact that rather than hold up traffic these cars facilitate it, as they pick up speed a great deal quicker than the average trolley which is bigger and more cumbersome.

If the cars continue to be as great a success as they have the past week, there is no doubt that they will become a permanent feature of the Connecticut Company.

With further regard to increased earnings there is apparently a rule that receipts increase at the same rate as service. This rule would, of course, not apply in cases where from one to two-minute headway is being given, but does seem to work where the headway has been over five minutes, as is shown in the following tabulation, based on information obtained from the American Electric Railway Association, Nov. 1, 1918:

	Per Cent Increase in Car-Miles With Safety Cars	Per Cent Increase in Receipts
Tampa, Fla., one line.....	29	30
Tampa, Fla., on another line.....	51	51
El Paso, Tex., on one line.....	48	50
El Paso, Tex., on another line.....	40	36
Seattle, Wash.....	21.7	29
Jacoma, Wash., on one line.....	20	25
Tacoma, Wash., on another line.....	3	17
Gary, Ind.....	62	46

The American Electric Railway Association stated on Oct. 4, 1919, that six companies reported 51.1 per cent in receipts for 53.4 per cent increase in car-mileage, one company reported 71.2 per cent gain for 79 per cent increase and Bridgeport reports 100 per cent gain for 100 per cent increase.

The principal "stock" objections to the one-man car are: (1) the car is too long, (2) it is too short, (3) it is too light, (4) it is too heavy, (5) it cannot be operated in heavy snow storms, (6) it will delay traffic and cannot be operated through congested districts, (7) the door arrangement is wrong, (8) it is homely.

*Abstract of paper read at New York City meeting of New York Electric Railway Association, Dec. 10, 1919.

As to the first five of these items it was Mr. Birney's idea that a car should be built which would meet average rather than maximum conditions. The heavy double-truck city car with large drop platforms was built with only rush-hour business in mind and because it was so expensive to operate during non-rush hours the headway was cut down as much as possible. In the average city an individual car is usually overcrowded for only a part of one trip in the morning, and a part of one trip in the evening. Why, then, should several tons of useless weight be hauled around for the rest of the time?

A study of traffic conditions in a large city was made recently by the writer to ascertain the average and maximum car loads. Traffic checks were made on all lines at places where the heaviest riding occurs, and it was found that at the point of maximum travel on only slightly more than 6 per cent of the trips run did the cars carry more than sixty passengers, which is the total capacity of the Birney car. All of the lines were considerably under the saturation point as far as headway is concerned. It is therefore obvious that the traffic as now being handled by two-man cars, weighing 30,000 lb. or more, could easily be handled with one-man cars weighing 15,000 lb. with only a slight increase in headway. Furthermore, any increase in headway would increase traffic.

The objection that the Birney car is too long and too heavy has been made by those who want to swing to the other extreme from the old type of heavy car. It may be possible that a smaller and lighter car would do better than the present car in some isolated cases, but such a car would not take care of average conditions so well.

The chief objection made to the lightness of the car is that it could easily be damaged in a collision. Experience has proved, however, that there are not so many or so serious collisions with safety cars as with the old types of cars, owing principally to the ease with which they can be handled.

Before the safety cars were put into operation at Bridgeport great care was taken by the Connecticut Company to train the operators as to the proper handling of them. The men were especially drilled in the prevention of collisions. They have made an excellent record with respect to damaged front ends. The nine Bridgeport cars have operated more than 222,000 car-miles in six months with only six pull-ins on account of damage to front ends by reason of collisions.

As to the delaying of traffic it is noticeable that in congested districts wherever the safety cars have been operated there has been an entire absence of unfavorable criticism in regard to their ability to move readily over the most congested part of the lines. For example, in Seattle safety cars operate for about 1½ miles on Second Avenue. This is the most heavily traveled street in the city and carried so much traffic as to have rendered desirable the rerouting of certain lines in the endeavor to relieve congestion. Safety cars, operating in conjunction with older types of cars on other lines, maintain schedule and crowd cars of other types.

In Kansas City a thirty- to forty-second headway is maintained through the congested district during the rush hours. The Kansas City Railway reports that "we have had no difficulty in making our schedule speed or our headway even in the hottest part of the downtown district."

In regard to Richmond, the following is an extract from the *ELECTRIC RAILWAY JOURNAL* of Nov. 1, 1919:

In Richmond the eighteen safety cars in operation at present make up the complete equipment on two lines. For a distance of 1½ miles through the center of the city these two lines run over the same tracks as five other lines on which the cars are all of the double-truck type, and there is also a very heavy grade. These conditions have presented no difficulties and the safety cars have not in any way delayed the double-truck cars.

In connection with this mixed service, Mr. Buchanan, the general manager, had some misgivings as to what might happen if one of the big cars (some of them weighing 57,000 lb.) should stall and a little safety car should be the next car to come along. This apprehension was completely dispelled by tests made at the shops and carhouses. It was found that one of the big cars stalled in the middle of a sharp curve could be coupled and moved with apparent ease by one of the safety cars.

In Bridgeport safety cars operate over about ½ mile of Main Street. The city has a population of approximately 175,000 and downtown traffic is concentrated along this one narrow street, producing very heavy congestion. A traffic check was made at the time of peak travel on an average day and it was found that there passed over the intersection of Main and Fairfield Streets a total of 1,261 vehicles per hour, including street cars. The distribution of travel was 58 per cent in one direction and 42 per cent in the other. The width of Main Street at this point is 38 ft. and of Fairfield Street 33 ft. Safety cars operate over this intersection, without "dragging the line." They are handled more easily than the double-truck cars that operate over the same tracks. There is apparently no reason why safety cars cannot be operated advantageously in the largest cities in the country, as far as street congestion is concerned, for there are few places where there is heavier street traffic than on Main Street in Bridgeport.

As to the door, the principal objection to the present type is that it is too small. The suggestion is that two doors would serve the purpose better, one for entrance and the other for exit. Now it is the maximum rather than average conditions upon which this idea is based. Taking into consideration all stops throughout the day, probably 95 per cent do not involve more than two or three passengers at one time. Why, then, should a complicated mechanism be installed to take care of the remaining 5 per cent of the stops, where there is heavy travel? As a matter of fact, even for handling heavy loading and unloading a single door is superior to two doors on a safety car, for more time would be lost through the manipulation of double doors and the confusion caused by simultaneous loading and unloading and the consequent inability of the operator properly to collect his fares than through the simple single-door operation and the queue system of loading and unloading. In any event the places where there is heavy loading and unloading are usually congested points, where the cars are as a rule delayed longer by street traffic than by passengers. Again, the addition of second doors on double-end safety cars would increase the weight of the car by about a ton, and it would double the maintenance of doors and door-controlling mechanism.

With further regard to the operation of safety cars through snow storms, the matter is very well disposed of in a statement recently made by the management of a property situated in the extreme Northeast, where safety cars are being operated and where there is plenty of snow. In this the opinion is expressed that passenger cars should not be bought with the idea of operating them successfully as snow plows. Even in such a climate as this the percentage of time per annum when cars operate under conditions that require them to remove

any considerable amount of snow is small. In this region the railway operators propose to protect the cars by removing the snow, and it is their belief that this is the proper way to protect the equipment of passenger cars no matter what the type is.

Finally, as far as the appearance of the car is concerned a street car at best is not usually considered a work of art. However, the comparative smallness of the safety car is an advantage from this standpoint.

To return to Los Angeles (after a lapse of forty years), according to a report of the California Railroad Commission just issued, the engineers of that commission have recommended that 400 one-man cars be purchased and put in operation on most of the lines of the Los Angeles Railway Corporation. They estimate that these cars will save \$625,000 per annum and will pay for themselves in about four years. I assume that these savings do not take into consideration any additional revenue that would be procured by increasing the service with safety cars, so that presumably still better results can be looked for if the service is increased.

The foregoing is written with the idea of showing, in a general way, how the safety car will improve net earnings and how it will work under severe conditions. As has been pointed out many times, however, it is not a cure-all. It has shown remarkable results though and it is believed that it will prove to be one of the principal factors in helping to put the urban electric railway business on its feet again.

"Automatics" on the New York State Railways*

A Résumé of Experience With Automatic Substations at Williamson and Manlius Center, Showing Annual Savings of More Than \$3,000 Each

BY C. L. CADLE

Chief Engineer New York State Railways, Rochester, N. Y.

ABOUT the middle of 1916 the New York State Railways planned the installation of an automatic substation to replace a floating storage battery on its Rochester & Sodus Bay line at Williamson, N. Y., and contracted in May, 1917, for this equipment. About the same time it contracted for similar equipment for its

*Abstract of paper read at New York City meeting of New York Electric Railway Association, Dec. 10, 1919.



WILLIAMSON AUTOMATIC SUBSTATION, NEW YORK STATE RAILWAYS

Manlius substation on the Oneida line, the West Shore electrification between Syracuse and Utica.

To obtain a satisfactory location at Williamson it was necessary to choose a site other than that used for battery purposes on account of the location of the transmission line with relation to the railroad. The building which now houses this equipment was designed specifically for automatic equipment, and the cost data following give a good indication what a substation completely new costs, at 1916 prices. The railway had previously lost one of its substations by fire, but had on hand, after the insurance adjustment, the frame of a 300-kw. rotary converter. This frame, together with a spare armature and three transformers, constituted the basis of the substation equipment. It was supplemented by the purchase of field cores, brush-holders, oil switches and the automatic control apparatus.

Shortly after the station was put into operation it was found economical to install a remote-control connection with the dispatcher's office in Rochester, approximately 30 miles away. This was accomplished by using the relay of a Gill selector in conjunction with the dispatcher's telephone line to permit the cutting out of the station during the night hours when no cars were in operation. This will account for a number of cases in the accompanying "interruption statement" where the station was in operation all night due to failure of the dispatcher to cut the station in or out at the prescribed time.



VIEWS IN WILLIAMSON SUBSTATION
AT LEFT, BANK OF TRANSFORMERS.
ABOVE, OIL SWITCH AND AUXILIARIES.
AT RIGHT, REHABILITATED
ROTARY CONVERTER

TABLE I—DATA ON WILLIAMSON AUTOMATIC SUBSTATION

Non-automatic substations on line operate hours per day.....	18
Automatic substation operates (as for week ending Nov. 29), hours per day.....	9
Saving in operating time, hours per day.....	9
Per cent. of time automatic station operates, as compared with non-automatic stations.....	50
Cost of land.....	\$553.50
Cost of building.....	5,424.63
	\$5,978.13
Cost of automatic substation equipment.....	\$7,593.55
Cost of labor to install.....	1,746.71
Total.....	\$9,340.26
Annual charges, exclusive of land and building:	
Fixed charges and depreciation at 10 per cent.....	\$934.02
Repairs to equipment, estimated.....	200.00
Inspection 1½ hours per day at 45c. per hour.....	246.60
Total yearly expense.....	\$1,380.62
Annual gross saving:	
Labor of three men at 45 cents per hour, eight hours per day.....	\$3,942.00
Relief operator, seventy-eight days per year, eight hours per day at 47½ cents per hour.....	296.40
Saving in power, estimated:	
Nine hours per day, running light, at 8 kw.-hr. per hour, or 72 kw.-hr. per day; 72 kw.-hr. per day for 365 days, or 26,280 kw.-hr. at 0.9 cents per kilowatt-hour.....	236.52
Total gross saving.....	\$4,474.92
Annual charges.....	1,380.62
Annual net saving applicable to automatic equipment.....	\$3,094.30
Number of years to cancel original cost.....	3

TABLE III—DATA ON MANLIUS CENTER AUTOMATIC SUBSTATION

Substation operated non-automatically, hours per day.....	20½
Substation operated automatically, hours per day.....	13
Saving in operating time, hours per day.....	7½
Per cent of non-automatic running time substation operates automatically.....	63.5
Cost to install automatic equipment.....	\$3,400.00
Freight.....	42.00
Miscellaneous material, conduit, wire, etc.....	275.42
Total.....	\$3,717.42
Labor cost.....	483.20
Total cost to install.....	\$4,200.62
Annual charges:	
Fixed charges and depreciation, at 10 per cent.....	\$420.06
Repairs to automatic equipment (estimated).....	100.00
Labor cost to inspect, one and one-half hours per day, at 45 cents.....	246.60
Annual yearly expense.....	\$766.66
Annual gross saving:	
Labor of three men at 45 cents per hour, eight hours per day.....	\$3,942.00
Relief operator seventy-eight days per year, eight hours per day, at 47½ cents per hour.....	296.40
Saving in power estimated, 7½ x 8 kw., 60 kw.-hr. per day, 21,900 kw.-hr. per year at 0.92 cent.....	201.48
Saving in coal for heating substation.....	200.00
Gross saving.....	\$4,639.88
Annual charges.....	766.66
Net annual saving.....	\$3,873.22
Number of years to cancel original cost.....	1.1

TABLE II—INTERRUPTIONS AT WILLIAMSON AUTOMATIC SUBSTATION FROM AUG. 1 TO NOV. 30, 1919

Date	From	To	Duration of Interruption Hr. Min.	Cause of Interruption
8-14	5.45 a.m.	8.00 a.m.	2 15	Relay trouble.
8-6	5.20 a.m.	7.33 a.m.	2 13	Overspeed device tripped out d.e. breaker.
8-7	8.10 a.m.	8.35 a.m.	.. 25	Oil switch clutch out of adjustment.
8-17	7.35 a.m.	8.00 a.m.	.. 25	D.c. contactor did not close, cutting machine online.
8-19	12.29 a.m.	15.57 a.m.	.. 28	Overspeed device tripped out d.e. breaker.
8-20	8.30 a.m.	12.00 m.	15 30	Operating coil on oil switch burned out.
8-21	5.20 a.m.	11.30 a.m.	6 10	Operating coil on oil switch burned out.
8-23	5.20 a.m.	12.00 m.	18 40	Operating coil on oil switch burned out.
8-29	5.20 a.m.	8.00 a.m.	2 40	Overspeed device tripped out d.e. breaker.
Total interruptions for Aug....			48 46	
9-7	5.20 a.m.	7.35 a.m.	2 15	Overspeed device tripped out d.e. breaker.
9-26	5.20 a.m.	7.35 a.m.	2 15	Remote control not cut in by dispatcher.
9-29	7.00 a.m.	12.00 m.	15 00	Rotary armature grounded.
9-30	5.20 a.m.	12.00 m.	18 40	Rotary armature grounded.
Total interruptions for Sept....			38 10	
10-4	5.20 a.m.	7.40 a.m.	2 20	Remote control not cut in by dispatcher.
10-5	6.45 a.m.	11.00 a.m.	5 15	Open in 1 external, resistance of No. 29 relay.
10-15	5.20 a.m.	7.45 a.m.	2 25	Remote control not cut in by dispatcher.
10-15	1.25 p.m.	12.00 m.	10 35	Open circuit in rotary armature.
10-16	5.20 a.m.	11.00 a.m.	5 40	Open circuit in rotary armature.
Total interruptions for Oct....			26 15	
11-19	5.20 a.m.	7.55 a.m.	2 35	Remote control not cut in by dispatcher.
11-11	12.50 a.m.	5.35 a.m.	4 35	No. 2 relay stuck in, allowing rotary to run.
11-11	8.05 p.m.	12.00 m.	3 55	No. 2 relay stuck in, allowing rotary to run.
11-12	12.00 m.	1.30 a.m.	1 30	No. 2 relay stuck in, allowing rotary to run.
11-15	12.57 a.m.	5.40 a.m.	4 33	No. 2 relay stuck in, allowing rotary to run.
11-16	5.20 a.m.	7.40 a.m.	2 20	Remote control not cut in by dispatcher.
11-22	1.00 a.m.	5.20 a.m.	.. ..	Machine cut in and out several times as dispatcher did not cut out remote control.
11-28	5.20 a.m.	8.05 a.m.	2 35	Armature in No. 2 relay stuck open.
11-29	8.45 p.m.	12.00 m.	3 15	D.c. breaker out.
11-30	12.00 m.	7.30 a.m.	7 30	D.c. breaker out.
Total interruptions for Nov....			32 48	
Grand total.....			146 9	

TABLE IV—INTERRUPTIONS AT MANLIUS CENTER AUTOMATIC SUBSTATION

MAY 1, 1919, TO DEC. 2, 1919		
Caused by opening of d.c. circuit breaker (non-automatic)		
	Hr.	Min.
5-13.....	..	5
5-15.....	1	48
5-18.....	13	0
5-23.....	1	23
6-4.....	..	12
7-6.....	2	50
7-15.....	2	50
8-31.....	..	55
9-1.....	1	32
9-3.....	1	41
9-17.....	1	7
10-3.....	1	3
10-12.....	3	44
10-18.....	1	6
11-9.....	1	15
11-11.....	1	25
11-16.....	1	17
11-17.....	1	44
11-20.....	1	9
11-30.....	1	3
Total.....	41	9
Caused by armature shaft sticking in bearing		
7-14.....	..	26
7-15.....	2	50
7-17.....	5	40
7-18.....	1	5
7-20.....	2	40
7-31.....	2	53
8-9.....	3	0
8-20.....	4	20
8-21.....	1	45
8-22.....	..	20
Total.....	24	59
Due to trouble with automatic equipment		
	Hr.	Min.
5-14.....	2	24
6-1.....	7	46
6-14.....	..	26
Total.....	10	36

NOTE.—Resistance furnished with polarized relay too low; 4,000 ohms substituted for 3600 ohms.

The Manlius substation, which is located approximately 5½ miles east of the Syracuse city line, was equipped at the time of the West Shore electrification with two 300-kw. rotaries. After it had been in operation for a few years changed condition of the traffic load dictated the removal of one rotary to another location. This remaining machine was operated, previous to the installation of the automatic equipment, by three men working on eight-hour shifts.

These two stations are of particular interest due to one having been built especially for an automatic operation, while the other is an adaptation of a manually-operated substation to automatic control.

The automatic equipment at Williamson eliminates the operation of the rotary 50 per cent of the time during which it would otherwise have been operating and at Manlius 36.5 per cent. At Williamson this produces an annual saving of \$236.52 in power cost and at Manlius \$201.48.

Between May 1 and Dec. 2, 1919, there was a total of about seventy-seven hours' interruption at the Manlius station, forty-one hours of which was due to the opening of the direct-current circuit breaker from sudden overloading; twenty-five hours was due to electrolysis of the armature bearing causing the bearing bab-bitt to adhere to the armature shaft, and ten and a half hours was chargeable directly to the automatic equipment. At Williamson there were interruptions totaling 146 hours between Aug. 1 and Nov. 30, 1919. These, while affecting the station, were not serious and did not require the immediate attention that would have been given had the station been in a more important location. However, it is to be expected that, with the installation of new equipment, troubles will occur during the first

few months of operation, but these will be eliminated through experience with the apparatus.

The principal items of interest at this time in regard to automatic substations are: (a) cost to install, (b) reliability of operation and (c) saving in operating expenses. These data for the New York State Railways are summarized in the accompanying tables. The illustrations give a general idea of the equipment in the substations and the layout of apparatus.

Using Lever Throw-Type Track Switches for Safety

At Locations Where Traffic Conditions Make It Dangerous to Use a Switch Which Must Be Held in Position, the Use of a Throw-Over Switch Has Advantages

BY CLIFFORD A. ELLIOTT

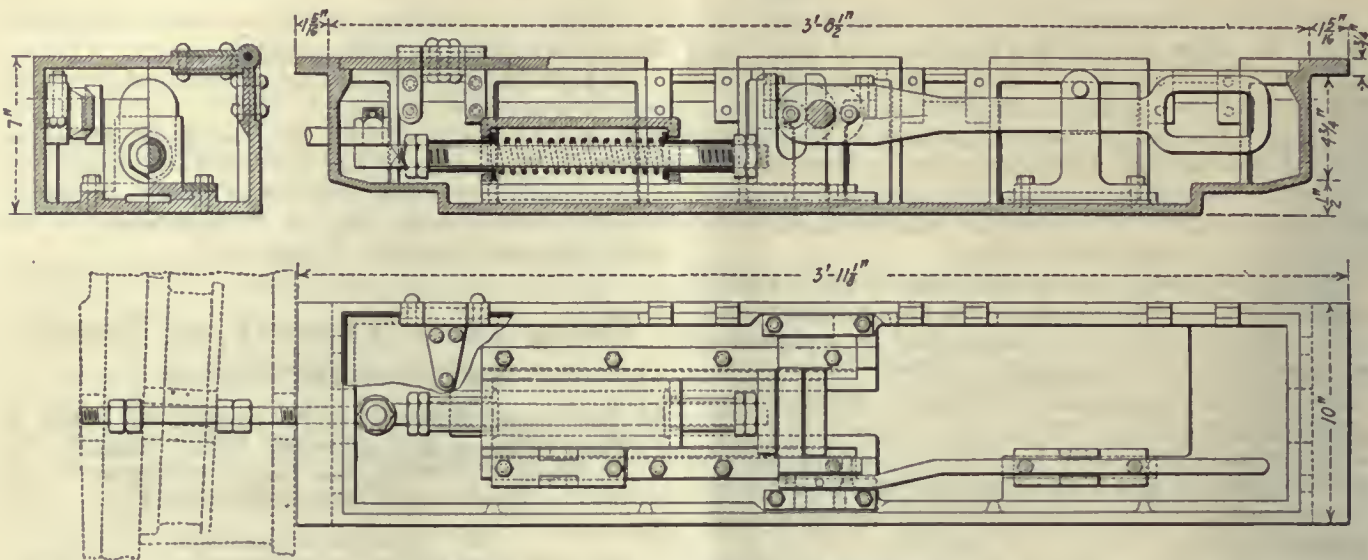
Cost Engineer, Pacific Electric Railway, Los Angeles, Cal.

SEVERAL years ago the Pacific Electric Railway found it advisable to adopt a type of switch on its tracks different from the type, commonly known as the chain-pull type, then in use. This change was rendered necessary due to the rapid increase in the number of automobiles passing the points where switches were installed and to meet increasingly difficult operating conditions. Where large special track work layouts exist at busy street intersections the trainmen are placed in a hazardous position while holding switches of the chain-pull type, especially where train operation is used. At many locations the space between the pull-box and the curb line is very limited and as it is necessary for the trainmen to hold the chain-pull switch in position



INSTALLATIONS OF LEVER-TYPE THROW-OVER SWITCH

1—Switch Box Outside of Track. 2—Interior of Switch Box Outside of Track. 3—Switch Boxes Located Between Rails at Passenger Terminal. 4—Interior of Switch Box Between Rails.



ASSEMBLY OF GROUND THROW-OVER SWITCH

from the box until all trucks of the train have cleared the turnout, he frequently has to keep this position for a considerable time. His position prevents any attempt to guard himself against auto speed violators who are liable to misjudge his position in the street and run him down. If to avoid injury the trainman releases the chain-pull switch before all tracks of the train clear the turnout derailment is unavoidable.

To provide for these conditions a new lever throw-type of track switch was designed by the railway engineering department and was made in the company's shops. The accompanying views illustrate this type of switch. The switch mechanism is made of cast steel,

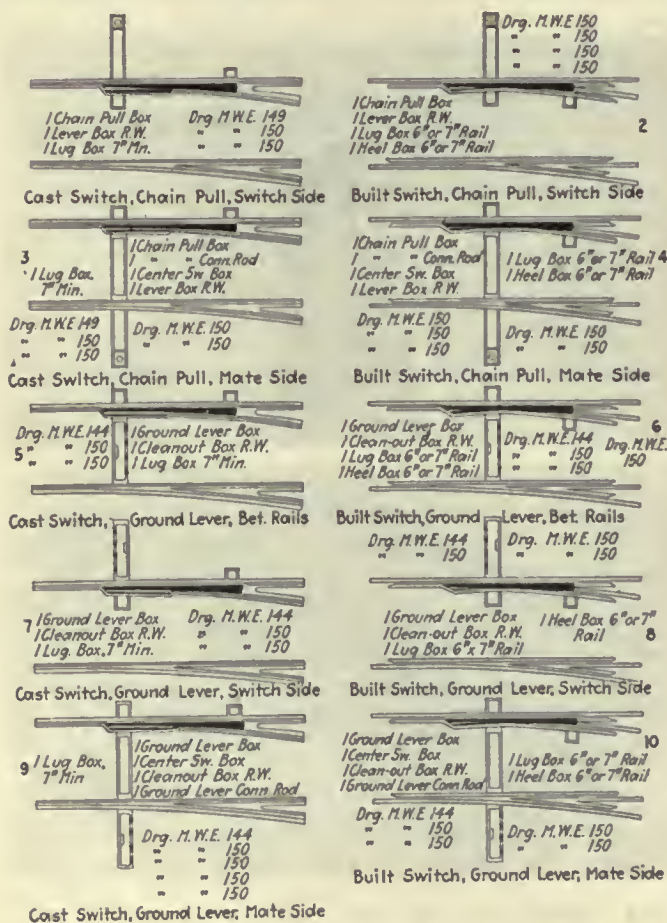
the housing box of wrought iron or steel, and the box cover of a steel plate. The switch-box shown in the illustration is 4 ft. long, 10 in. wide and 7 in. deep.

For the convenience of all concerned in ordering the proper type of switch for any definite location, a standard drawing has been prepared giving the different parts that are necessary to be ordered to meet different arrangements and conditions. Each arrangement is given a symbol number and when placing a requisition with the store department the roadmaster is required only to specify the symbol number and all necessary detailed parts are furnished.

This company uses the positive type of throw-over switch extensively in terminal yards where the clearance between operating tracks is insufficient to permit switchmen safely and efficiently to perform the switching operations. In such cases the lever throw-type of switch is installed between the rails. Yard men are provided with iron hooks which enable them to lift the switch-box covers quickly and to throw the lever over to the desired position with the least possible delay. Accompanying views show the lever throw-over switch applied between the rails and also located outside the rails as is necessary at busy street corners. Where local and interurban service is given over the same line the switch is set positive for the local line, while the less frequent interurban service requires operation of the lever-throw switch before the train can turn into the track as scheduled. In such a case the trainman would first throw the lever and then step onto the curb so as to be clear of vehicles, while the train clears the switch. He then can return and throw the lever back to its former position.

The maintenance and care of this type of switch has been found to be comparatively slight.

Franklin T. Griffith, president Portland Railway, Light & Power Company, Portland, Ore., has just been appointed chairman of the committee on water-power development of the N. E. L. A. The committee proposes to undertake an investigation of the water-power resources of the country, both developed and undeveloped. The study will be made respecting the practical application of pending national legislation on the subject and of the economic advantages which could be obtained through a more general interconnection of water-power systems.



SWITCH STANDARDS ARRANGED FOR CONVENIENCE IN ORDINARY PARTS

C. E. R. A. Holds Two-Day Session

Important Subjects of Electric Railway Express and Economy of Car Operation Considered at Central Electric Railway Association Convention, Held at Grand Rapids, Mich.

THE Central Electric Railway Association met at Grand Rapids, Mich., for its fall meeting on Thursday and Friday, Dec. 4 and 5. A report of the meeting follows and abstracts of some of the papers appear elsewhere in this issue.

The executive committee met during Thursday forenoon and elected two new supply members to the association. A. Swartz, general chairman of the Interurban freight and motor truck competition committee, reported progress in the work of his committee. The Indiana sub-committee made its report at the summer meeting of the association in June. The Michigan sub-committee has reported to Mr. Swartz, and the Ohio sub-committee has not yet reported, but is making progress. Mr. Swartz urged the management of the various interurban properties to look well to their short-haul freight, as this is most likely to be taken over by truck competitors. At the invitation of Harry Reid, president, Interstate Public Service Company, Indianapolis, the executive committee set the place for the annual meeting of the association as Louisville, Ky., and the date as Feb. 26 and 27.

On Thursday afternoon the convention was called to order by President J. F. Collins, general manager Michigan United Railways, Jackson, and the delegates were officially welcomed to the city by the mayor of Grand Rapids. The secretary of the local Chamber of Commerce then gave a brief address of welcome, during which, among other things, he said, "Franchises must no longer be a political football but must be a business transaction." The mayor and the Chamber of Commerce of Grand Rapids believe in a square deal to public utilities. If the various utilities throughout the country are to be placed upon a satisfactory basis and are to obtain the financial income which they need, assistance must come directly through the Chamber of Commerce of a city and through no other local organization.

E. B. Burritt, secretary of the American Electric Railway Association, extended greetings to the Central Association on behalf of the national organization. Mr. Burritt said he believes the officers of the American Electric Railway Association should attend the Central Electric Railway Association and other state association meetings almost as faithfully as those of the national association. He spoke of the work accomplished by the American Association at Washington. The resulting publicity was most helpful. The work carried on in the conduct of these hearings has been a big strain on the association, and at the Atlantic City meeting a committee on dues was appointed. This committee has since reported and suggests that the dues to the American Association be based upon a percentage of the operating revenue. Nobody wishes to see the American Association go backward, but wants it to maintain its leadership of the industry. Mr. Burritt also announced the midyear meeting of the American Association to be held at Cleveland, Ohio, Jan. 8, at the Hollenden Hotel.



EXHIBIT OF HISTORIC CAR TYPES AT
GRAND RAPIDS

Following the regular business, a nominating committee was appointed to report at the next meeting of the association. It included F. D. Carpenter, chairman, president Western Ohio Railway Company, Lima; C. L. Henry, president Indianapolis (Ind.) & Cincinnati Traction Company; W. S. Rodger, general traffic manager Detroit (Mich.) United Railway; S. D. Hutchins, Westinghouse Traction Brake Company, Columbus, Ohio, and W. H. Bloss, Ohio Brass Company, Mansfield, Ohio.

DIVISION OF OPINION ON ADVISABILITY OF PICK UP AND DELIVERY

"Electric Railway Express" was the subject of a paper presented by C. J. Munton, general manager, Fort Wayne & Northwestern Railway, Kendallville, Ind. and written discussions on the paper were presented by S. L. Vaughn, trainmaster, Grand Rapids, Grand Haven & Muskegon Railway, J. F. Starkey, general passenger agent, Lake Shore Electric Railway Company, Sandusky Ohio, H. A. Nicholl, general manager Union Traction Company of Indiana, Anderson, and C. J. Laney, traffic manager Northern Ohio Traction & Light Company, Akron. Each of these discussions appear in abstract elsewhere in this issue.

Following the presentation of the written discussions, the meeting was thrown open for general discussion. F. W. Brown, traffic manager Michigan Railway, Kalamazoo, said that the handling of express in the manner followed by the old-line express companies was very unsatisfactory. The handling of package express as outlined by Mr. Laney may be more feasible. Mr. Brown believes, however, that the pick-up and delivery feature is a mistake, as such service is foreign to the average electric railway man. This end of the express business should be handled by a separate company. The handling of packages on passenger interurban cars has in many cases largely overcome the loss incurred by the withdrawal of the American Express business. The rate of this class of service on the

Michigan Railway is double the first-class freight rate, but the handling of packages has not in any way interfered with passenger service. Also, there is no direct cost attributable to this service, as the same number of men are required in a crew as is usual for handling baggage, etc.

W. S. Rodger said that the class of business outlined by Mr. Brown is very profitable for those roads which have the proper facilities. Mr. Rodger does not favor the pick-up and delivery feature.

C. L. Henry said that the subject is one of the most important that has come before the association for a long time. He hopes that the association will continue the study of express handling and would like to see all the papers presented on the subject printed in pamphlet form. The consensus of opinion, he said, seems to be that if all the interurban roads were under one management, or were combined into one company, the handling of through freight and express could be worked out to great advantage. Mr. Henry is not convinced that the pick-up and delivery feature is a good thing, but believes that it does not necessarily follow that the association should not give that phase of the work very serious consideration and carefully investigate the possibilities of such service. In Indiana, Mr. Henry believes the interurbans have already made up the loss of the business taken away by the American Railway Express Company by the station-to-station service now in effect.

ORGANIZATION OF A SINGLE ELECTRIC RAILWAY EXPRESS COMPANY FAVORED

He suggested that an organized express company to handle the freight and express of all the interurban lines in the Central Association might be formed, and such possibilities are well worth investigating. He then said he would like to see President Collins put in motion an organized effort to see what actual physical obstacles stand in the way of through express service and to have published a full and intelligent statement of the results of the investigation.

Later President Collins announced that a committee to carry out this suggestion would consist of H. A. Nicholl, chairman, W. S. Rodger, E. F. Schneider, F. W. Brown, and J. H. Crall.

ORGANIZATION OF ELECTRIC EXPRESS COMPANY DISCUSSED

E. F. Schneider expressed himself on being opposed to the idea of handling baggage and express on passenger interurban cars. He believes this interferes with passenger service. There is no question but that interurban express business is profitable. C. L. Henry said that the greatest trouble now existing is in the fixing of rates for through business. The formation of a single interurban express company would eliminate this. C. J. Laney said that another difficulty with handling through express is that many small interurban roads do not operate their sub-stations after 2 a.m. These properties would not realize sufficient income on the express passing over their tracks to warrant the addition of several extra men to the substation force.

C. J. Munton stated that the indications are that an interesting investigation will result from the papers and discussions presented on the subject of electric railway express. The situation as outlined by the written discussion of C. J. Laney is probably true at

the present time. The interurban lines should, however, begin now to put their properties in such order that through express business can be handled without any transfer of the commodities. With the nucleus which the interurban roads of the Central Association now have, E. F. Schneider believes that a single electric railway express company could be formed. Such a company could determine the connections and other changes in tracks, etc., which would be necessary to handle through express to the best advantage.

Closing the discussion on electric railway express M. B. Lambert, Westinghouse Electric & Manufacturing Company, said that it is up to the railway companies to give the local chambers of commerce and other business interests the facts. The American Association is doing a big work along this line. The information which it collects is sent throughout the country over the Associated Press wires. The American Association wishes to pick out men all over the country to whom publicity material may be mailed for local distribution.

At the close of the Thursday session President Collins announced that on the track adjacent to the hotel several cars had been placed for the inspection of the delegates. Included in these was a horse car of the bygone days, one of the first electric cars of the Grand Rapids Railway, and one of the latest type of steel city cars of that company. There was also one of the first interurban cars purchased twenty years ago by the Michigan Railway and in comparison with this one of the latest type of steel interurban cars purchased by that company.

ELECTRIC RAILWAY EXPRESS ALSO SUBJECT AT BANQUET

On Thursday evening a banquet followed by an informal dance was held at the hotel. The speaker at the dinner was L. G. Macomber, traffic commissioner of the Toledo Commerce Club. Mr. Macomber first outlined the interurban situation in Toledo while the city was without street-car service, and then gave some comprehensive figures relating to the possibilities of motor-truck competition in the handling of express. In June of this year the interurban lines emanating from Toledo, exclusive of the Ohio Electric Railway, handled out of Toledo 16,000,000 lb. of merchandise, and 12,000 passengers. During the period in which the interurban lines were not allowed to enter the city reports show that practically all of this merchandise business was handled in some other manner.

Mr. Macomber paid a high compliment to the co-operation which the Toledo Commerce Club has received from the officials of the interurban companies. As soon as it was known that the street cars had been removed from Toledo and that the interurban cars would not be permitted to enter the city, steps were taken to find a terminal at the city limits into which all lines could be brought. This could not be accomplished, and an effort was then made to locate a terminal within the city where freight could be received and dispatched to the city limits by means of motor trucks. The Highways Transport Committee agreed to furnish the motor trucks, and the rate was set at 8 cents per 100 lb. Tariffs were also arranged through the Interstate Commerce Commission, and had the street cars not resumed service in Toledo, it was expected to begin handling of express and freight in this manner on Dec. 8.

Passing on from the Toledo situation Mr. Macomber

said that the interurban railway is in a position to serve a small city better than is the steam road. The growth of a community depends upon its transportation facilities. The interurban has gradually replaced the steam road for jobbing service. Today, it is not a question of cost of express service as much as it is a question of the service itself. For a reasonable haul the interurban need expect no competition from the steam road, as the steam lines cannot make any money on express or freight hauled a distance of less than 60 miles, and this service does not become attractive to the steam lines for a distance of under 120 miles.

INTERURBANS HAVE REASON TO FEAR COMPETITION OF 5-TON TRUCK

Mr. Macomber quoted some figures on motor-truck service for a 25-mile haul, with a 2-ton truck, at 22 cents, this being the average for the first four freight classifications. In this case the cost of operation would amount to \$15.52 and the cost of gas, oil, tires, etc., \$5, or a total of \$20.52, leaving a balance of \$1.50 for investment, expenses of driver and helper, etc. If a full load could be carried in both directions the truck operators might make money, but in general the interurban lines need fear no competition from the 2-ton truck.

Interurban railways have reason for apprehension from competition with the 5-ton motor truck, which is the usual truck used for this purpose. To fight this competition the interurbans must improve their service, especially as concerns terminal facilities. The average business man is now figuring the cost of handling goods from his warehouse rather than giving consideration only to the amount of the railway transportation charge. Delay at the warehouse is extremely expensive to the manufacturer. Trucks are sometimes delayed at interurban terminals as much as four hours, which represents a loss to the manufacturer of \$20.

The interurban railway operator should make a very careful study of the actual cost of handling freight and express and of the elements which enter into this cost. The time is opportune to invite into conference the traffic men of the localities through which the companies operate and to secure their co-operation. Consideration must be given to two very important subjects: First, the quality of the service, and second, the cost of the service.

ECONOMIES IN CAR OPERATION CONSIDERED

"Economies In Car Operation" was the subject of a paper presented on Friday morning by F. R. Phillips, superintendent of equipment, Pittsburgh (Pa.) Railways Company. Following Mr. Phillips' paper, written discussions were presented by very nearly every interested department. "A Conductor's View" was presented by Charles Connely, conductor Grand Rapids, (Mich.) Grand Haven & Muskegon Railway, "A Motorman's View" by J. A. Sunderland, motorman Terre Haute, Indianapolis (Ind.) & Eastern Traction Company, "A Dispatcher's View" by R. E. Harris, train dispatcher Michigan Railway Company, Jackson, "A Master Mechanic's View" by Terence Scullin, master mechanic Cleveland (Ohio) Railway Company, "A Claim Adjuster's View" by J. W. Giltner, assistant claim agent Northern Ohio Traction & Light Company, Akron, and "A Superintendent's View" by A. G. Snell, superintendent Union Traction Company of Indiana. Abstracts of these papers will be printed next week.

The papers show a marked interest, on the part of the men who directly control the details of operation, in the possibilities of obtaining notable economies. They give the impression that if the several departments will co-operate along the lines outlined by Mr. Phillips, and continued by the contributors to the discussion there is warrant for belief that operating expenses can be materially reduced.

Following the papers and written discussions, F. R. Phillips stated that he feels that other associations could well initiate the example of the Central Electric Railway Association as regards enthusiasm and co-operation. He believes the electric railway situation is much brighter in aspect and that the silver lining of the cloud is beginning to show.

M. B. Lambert said that T. Scullin in his written discussion left an important thought. Mr. Lambert moved that the Central association appoint a committee, to include a representative of each department of the railway company to study the subject of possible economies in car operation and to issue a printed report. In answer to a question from President Collins concerning what the return circuit should be, Mr. Lambert replied that the amount of feeder and return depends entirely on the analysis of the problem. The cost of feeder, bonding, etc., must be determined, and as a rule it is economy to have the least drop possible both in feeder and return.

Electric railway companies must resort to a scientific analysis of operating problems and to publicity, said Mr. Lambert. The thing that most affects the operating cost is the maintenance of equipment. The average general manager apparently does not have a complete appreciation of this. The position of the master mechanic must be lifted out of the rut. This is the mechanical age, and provision should be made in every shop for the technically trained man to advance through the mechanical department.

ECONOMY IN POWER CONSUMPTION AT CAR VERY IMPORTANT

L. E. Gould, Economy Electric Devices Company, emphasized the ability of the motorman to keep the energy consumption at a minimum both in acceleration and retardation. The curves for each are about the same.

Fast application of the brakes above a certain point is not profitable from a power-saving standpoint and will not increase the speed of operation. The urements taken in a test on a line of 100 cars with all cars equipped with Economy meters and with power stations also so equipped has shown that from 8 per cent to 30 per cent of the power was being lost at the car before the meters were installed. The installation of the meters on a line of 8000 cars with sixty cars equipped and power measured has shown a saving of 25 per cent in brake shoes and 16 per cent in energy on the cars equipped with the meters.

C. L. Henry suggested that all of the papers presented at the Thursday and Friday sessions be printed in the form of a pamphlet and circulated among the member companies. Secretary Neereamer was instructed to carry out this suggestion. After an expression of thanks to all who had delivered papers at the meeting, the convention was adjourned until the next meeting of the association at Louisville, Ky., on Feb. 26 and 27.

C. E. R. A. Papers on Freight Haulage

Symposium of Opinions by Authorities in Central Electric Railway Association Territory,
Initiated by a Paper by C. J. Munton—The Contributors Include
Managers and Passenger and Freight Agents

THE feature of the Dec. 4 afternoon session, of the Central Electric Railway Association meeting, held at Cleveland, Ohio, on that and the following day, was a paper prepared and read by C. J. Munton, on "Possibilities of Electric Railway Express Service." It was discussed by representatives of several departments of the electric railway. Abstracts of the paper and written contributions to the discussion are given below.

Possibilities of Electric Railway Express Service

Extension of Service Now Given Would Be Profitable—The Results of a Recent Questionnaire Are Published

BY C. J. MUNTON

General Manager Fort Wayne & Northwestern Railway

INTERURBAN electric railways in general have but one commodity to sell, and that commodity is transportation in all its forms from limited passenger service to the switching of steam railroad carload shipments which are occasionally turned over to us.

In my discussion of this subject, I shall view the existing interurban electric railways in the Central territory in the light of one system rather than an aggregation of many railways, each with its management and complement of officers functioning as best they may under existing conditions. It is my unqualified belief that were it possible to combine and centralize the management of the electric railway companies now operating in the Central States under four or five managements, it would be of benefit to the public and of profit to the owners. The territory now being served by the existing electric railways would gain by reason of the broader policy of management which would surely obtain in the way of co-ordinated transportation service in all its phases, and the owners would profit by the economies to be obtained under centralized management.

This, however, is entirely aside from the purpose of this paper, and I believe a system of electric railway express service can be established under proper conditions which will provide express service similar in character to that now being provided by the American Railway Express Company.

Electric railway companies already have their investment in tracks, terminals and power-house equipment, and with some additional express equipment could undertake the handling of a large volume of those commodities usually shipped by express. A large number of interurban electric railways operate some form of package freight or express service, and a considerable number of electric railways provide both classes of service.

It is unnecessary to discuss the existing system of dispatch freight which provides in a limited manner for the shipment of nearly all articles of commerce over

one or more connecting electric railways by means of through billing, in accordance with provisions of public tariffs approved by proper regulating commissions. We are all more or less familiar with this class of service and I believe will agree that with increased terminal facilities and rolling stock and in some cases a modification of existing franchise restrictions, this class of service can be greatly extended and expanded to the mutual benefit of the public and the industry.

EXTENT OF SERVICE POSSIBLE

In considering the subject of electric railway express, let us visualize for a moment the territory served by continuous lines of electric railways in Ohio, Indiana and Michigan and extending into Kentucky, New York, Pennsylvania, Illinois and Wisconsin. This system of electric railways connects a greater population and larger industrial and commercial centers than is connected in the same manner in any other country in the world. Why should not electric railway carriers make a strong bid for the business of the shipper who wants an express package delivered from Buffalo or Pittsburgh to Cleveland, Toledo, Detroit, Grand Rapids, Columbus, Cincinnati, Indianapolis, Chicago or Milwaukee?

Take a map of the Central electric territory and glance at the large industrial centers located on electric railway lines which could act as feeders to the main trunk lines. Why should there not be established a system of trunk express lines operating between the principal cities in the Central States, let us say from Pittsburgh to Cleveland, from Cleveland to Cincinnati via Columbus and Dayton, from Cleveland to Detroit via Toledo, from Detroit to Grand Rapids, from Toledo to Indianapolis, from Indianapolis to Chicago and from Chicago to Milwaukee. With the establishment of such a system of trunk express lines, other lines would act as feeders and bring in a large volume of express business.

There are those who have given some study to the subject and believe that it would not be profitable to establish a pick-up and deliver service in every town and hamlet in which there might be an express office. It is undoubtedly true that it would not be profitable to establish a pick-up and deliver service in towns of less than a certain population. Even in large industrial cities such a service could well be confined to certain districts beyond which, if it were established, there would have to be a system of zone charges for such service. It ought to be entirely feasible for electric railway express service to enter into competition with existing express service and it should be possible to provide a better service at rates not in excess of those now charged.

During the month of October a brief questionnaire was mailed to a number of electric railways in the Central Electric territory. The questions and answers received are as follows:

Does your company handle express shipments under contract with the American Railway Express Company?

In answer to this twenty-nine companies, of which nine had never handled old-line express, replied that their contracts had been cancelled after the express companies had been consolidated under the American Railway Express Company. Five companies replied that they were still handling express under contract with the American Railway Express Company but that the revenues received had been very largely reduced and in some cases had nearly reached the vanishing point.

What were the earnings from this service for six months ending June 30, 1918, and six months ending June 30, 1919?

Of thirty-four companies replying, twenty gave their total earnings for six months ending June 30, 1918, as \$127,796 and for six months ending June 30, 1919, as \$17,938 or a decrease for the two six-month periods compared of \$109,758, nearly \$220,000 annually. It must be born in mind that most of this express business was carried upon the regular passenger cars of the companies providing the service.

Does your company handle "local" express shipments?

Twenty-four companies replied yes; ten, no.

If so, do you operate pick-up-and-deliver or station-to-station service only?

Twenty-four companies replied they were handling station-to-station service only.

Is this service handled on passenger cars or on express cars provided for the purpose?

Twenty-four companies replied that the service was provided on passenger cars.

How frequent is your express service?

As a rule the answers indicated that the service was provided on all regular passenger cars.

What were the earnings from "local" express service for twelve months ending June 30, 1918, and twelve months ending June 30, 1919?

Of twenty-four companies handling "local" express, twelve gave their total earnings for twelve months ending June 30, 1918, as \$138,995, and for twelve months ending June 30, 1919, as \$200,454, an increase for the year ending June 30, 1919, of \$61,459. To my mind, these figures are highly significant.

The average revenue derived under contract with any of the old-line express companies provided that the electric railways were to receive 40 or 45 per cent of the gross revenue accruing to the railway on a basis of the number of miles it carried the express matter, as compared to the entire mileage the parcel was hauled. In other words, if a parcel traveled 1000 miles and was carried over four roads and if the revenue from carrying the parcel was \$10, the earnings accruing to the railways on a basis of 45 per cent of the gross revenue would be as follows:

First road, 400 miles, \$1.80; second road, 500 miles, \$2.25; third road, 30 miles, 13½ cents, and fourth road, 70 miles, 31½ cents. On the basis of receiving 45 per cent of the gross revenue, twenty electric railways in the Central States received approximately \$220,000 annually for providing space on their passenger cars which was used by the old-line express companies.

I believe the time has come when we owe it to the properties with which we are connected that we carefully consider some plan by which we develop an express service on the electric railway properties intrusted to our care. I believe that it is a subject

which should be carefully investigated by competent authorities and that this association should take active steps to cause such an investigation to be made. Because of the fact that electric railways operate more frequently, they should be able to provide a more flexible service which should appeal to the public.

We have service to sell and why should we not wholesale it in large quantities rather than retail it in small amounts?

Interurban Express*

Future Field of This Service Is Outlined—Pick-up and Delivery Service Not Recommended

BY H. A. NICHOLL

General Manager Union Traction Company of Indiana

EXPEDITED freight shipments, being consignments forwarded at rates and under conditions that are familiarly known in Central Electric Traffic Association territory as "merchants' dispatch freight" but designated by the public as "interurban express," are now designated in Indiana by tariffs filed as "express freight."

Express freight carried on passenger cars differs from the ordinary freight to the extent that the hourly passenger service of the average interurban line is open to this traffic, and it differs from express, as the word is commonly used in connection with the old-line express companies, to the extent that it has no pick-up or delivery service in connection with such shipments.

This service, in some form, has been rendered by traction lines for many years and, in fact, its inception probably came with the operation of the first interurban car. As early as 1900 it had gained some recognition as a transportation means superior for certain kinds of merchandise to any other form. As long ago as 1898, express service, with pick-up and delivery, was given by some electric lines, and to a degree was profitable.

The service has rapidly gained favor with the public, the demand being constant and persistent. In fact, the business obtained by the traction lines has been so great as to tax the facilities available for this purpose. The reason for this is the excellent service rendered by the operation of small units at frequent intervals, the lack of details in office routine, cumbersome checking, multi-billing and other such transactions, which make possible a quick and informal delivery, and a dependable, every-day service which is so recognized by the commercial and industrial world.

Great care must be exercised in order not to burden the traffic with such details of operation as would tend to slow up the service and thus destroy the very thing that is so highly prized by the shipping public. It has its limitations, and in order to maintain the advantages now enjoyed, efforts should be made constantly to secure rapidity of transactions, economy in manner of handling and improvement of facilities for taking care of the business.

RATES

The rates allowed in Indiana are now uniform, being based on one and one-half times the first-class local freight rate for the same distance. Where a shipment moves over two or more lines, an additional 20 per cent

*Abstract of paper presented at meeting of the Central Electric Railway Association, Grand Rapids, Mich., Dec. 4 and 5, 1919.

may be added to the rate, and as freight rates under the Disque scale have become uniform all over the country, express rates as a consequence may be uniform for like distances in all sections. It would seem to the writer that the rates now in effect approach very nearly the ideal basis as an acceptable proposition to the shipping public, being higher than parcel post but not as high as those of the old-line express companies.

Progress is being made toward the broadening of "express freight" (without the pick-up and delivery service). Recently, after a hearing before the Public Service Commission of Indiana pertaining to the uniform basis for express rates, and at the time the present rates and conditions were granted, a meeting of the operating and traffic officials of the various Indiana lines was held. At this meeting it was decided to place in effect a joint express freight tariff to cover all the connecting electric lines in the State for the purpose of handling through traffic. The compilation of rates was placed in the hands of a committee. It was further arranged at this same meeting that a complete set of division sheets or percentages be compiled to cover all of the connecting lines within the State, to be used as a uniform set of divisions jointly by all lines. This subject was also placed in the hands of a committee, and it is hoped that this committee will shortly be able to make a report. Therefore, it will be seen that extension of rates and divisions to other states will be a comparatively easy matter.

REVENUES AND EXPENSES

As to the proportion of revenues received which may be considered net profit, few, if any, of us can at present make any positive statement. The profitability of the traffic can only be gaged, comparatively speaking, with its big brother the freight service, as I do not believe that today many roads attempt to apportion operating expenses to the extent that "express freight" service is charged directly with its proportion of operating costs. This will undoubtedly come in time, when it may be possible to gain a reasonable knowledge of earnings and expenses properly belonging to this class of traffic. However, it should cost but little, if any, more to carry a ton of express matter than it does a ton of freight, as the transaction is practically the same in both instances. At the present time it is costing our company \$3.07 per ton for freight, and our revenues for express are \$11.15 per ton. Therefore, it seems reasonable that there is a nice margin of profit in the handling of express matter without the pick-up and delivery service.

In looking over some figures recently obtained covering old-line express operations for the period of six months ended Dec. 31, 1918, we find that direct costs chargeable to the pick-up and delivery system of the old-line express company amount to 28 per cent of the gross operating expenses, not counting any portion for loss and damage, superintendence, maintenance of buildings, rents of buildings, miscellaneous and other expenses. This being the case, it would seem to the writer that a larger per cent of costs than indicated might be saved to the old-line express companies, and is being saved by the electric lines, by not having the pick-up and delivery service.

BEST FIELD FOR ELECTRIC EXPRESS

The electric express freight for short hauls has a great advantage over the old-line express companies,

but for longer distances it would appear that the old-line express companies have the advantage over the electric lines, on account of the operation of through trains on fast schedules. This advantage should be particularly marked now when all the express companies are operated under one head and are able at junction points, on account of their consolidated facilities, to handle and transfer express matter more quickly and cheaply than it would be possible for the electric lines, without a vast expenditure of money on the part of the electric lines and without closer affiliation and co-operation.

Another advantage which the steam roads have over the traction lines for the handling of express matter between points distant to each other is the fact that the steam road trains are operated continuously night and day without any break in the service, which does not occur on electric railways, which have only an accommodation day service for the territory served.

Old-line express companies have such a volume of business on account of their operation all over the country that they can use the pick-up and delivery system more profitably than the electric lines, who only have the territory covered by their own lines to draw from. They also do a considerable amount of their business in the transportation of valuable packages; also of money, either by travelers' checks, money orders, or by the actual shipping of the money itself. This business they are able to handle in a very satisfactory and practical way, which in my opinion would not be possible by the electric railway, first on account of the operating service described, and second, because we do not have the high-grade, experienced agents and officials to take care of the business. If we entered the field to compete fully with the old-line express companies, we should be expected to take care of this part of the business, and a failure to do so would weaken our position.

CO-OPERATION NECESSARY FOR THROUGH BUSINESS

In reference to co-operation, this is a very vital factor in the handling of through business by more than one line. It has been the writer's experience that there are so many conditions prevailing on various electric lines that it is difficult to perform through service of any kind under 100 per cent co-operative conditions.

At the present time none of the electric lines, to my knowledge, has sufficient equipment, nor is the equipment in general so standardized that it can be operated with dispatch and economy in interline service. On account of the nonstandardization of the electrical equipment, it is not an easy matter for proper repairs to be made on foreign cars. It is true we have our interchange agreements for the operation of through cars, which not only cover the per diem and mileage charges and in some instances cover the cost of making repairs, still, under the conditions now prevailing, even these standards and charges are not sufficient to cover the situation and permit the operation of through trains with any degree of satisfaction. Of course we understand that between the larger terminals it might be desirable and thought necessary by some that the express business be handled in individual trail cars that could be pulled by regular passenger or freight trains, and in this way some of the aggravating difficulties such as the repairs of motors and other electrical apparatus be done away with; but if this method were

followed, on account of the location of connecting tracks and the schedules prevailing on the different lines, the delay in transferring the trailer from one road to another would be so great that the service would not be of much value as compared to the old-line service.

COMPETITION OF MOTOR TRUCK

Another factor to be considered, not only by the electric lines with the service they are offering but also to some extent by the old-line express companies, is the motor truck as it is operating today. From the strides made in this class of transportation in the past few years, neither we nor the old-line express companies dare pass over the matter lightly. We try to make ourselves believe that the operators of those trucks cannot exist on the revenues they are now receiving and with the expenses they are under. The fact remains, however, that they not only do exist, but that they are increasing their business rapidly throughout the country, the number of vehicles employed in this class of service probably having increased in the last few years several hundred per cent. The same theory was used as regards the existence of the jitney, but this pest is still in evidence, and possibly to as great an extent as ever in certain localities. Details of motor truck operation which we have been able to gather indicate the lowest possible operating cost is about 25 cents per ton-mile haul, which is far in excess of the revenue received by the electric railways. The motor trucks not only charge the same rates as the electric railways do for freight, but as an additional inducement, they perform the duties of the dray at both ends of the line. This service, which is becoming more dependable and reliable every day, cannot be otherwise than attractive to and be favored by the shippers, but it is difficult to understand how it can be performed at a profit.

CONCLUSIONS STATED

In conclusion I will state that I believe in the extension of the present express freight business to all electric lines, and that it eventually will prove a profitable source of revenue.

Let's put in the system as far as we can with the facilities at our command, and see what results we obtain. If there should be any considerable through business between important terminals, of course through motors or trail cars with messengers can be installed as the occasion demands.

I am opposed to the proposition of pick-up and delivery service in connection with our express freight service at the present time;

First, because of the expense of the service.

Second, because the volume of traffic is not great enough to justify the installation of this feature.

Third, because we can get all the business we can handle without it.

[NOTE.—It will be interesting to compare Mr. Nicholl's arguments against pick-up-and-delivery service with the points made "pro and con" at the New York City meeting of the New York Electric Railway Association last week and repeated elsewhere in this issue. While this feature of the electric railway express business was not as fully discussed as at Grand Rapids the general tenor of the discussion seemed to favor the auxiliary service. One speaker, F. W. Watts, said that his company, which gives this service, thought of abandoning it, but after careful analysis found the business profitable.—ED.]

Possibilities of Electric Express Service*

The Author Recommends a Pick-Up and Delivery Service and Gives Statistics of the Business of His Property

By J. F. STARKEY

General Passenger Agent
Northern Ohio Traction & Light Company

THERE is no chance for an argument that it is the desire of those financially interested in electric properties to work out some method by which added revenues may be obtained, and naturally we turn our attention to the express service and the revenues derived thereby as the theme for thought and discussion. Originally all properties placed their tariff rates, not only on express but for freight and passenger as well, at altogether too low a figure, and in many instances it has been a real fight to obtain the advanced rates we now enjoy. Many of these are still inadequate, considering the fearful ascent of operating cost, the summit of which I fear is not yet reached.

Mr. Munton cites the fact that the gross sum received by twenty companies for the six-month period ending June 30, 1918, was about \$128,000, and for the six months ending June 30, 1919, it was about \$18,000 or a total for the twelve months of approximately \$146,000, these figures representing the revenues from the operation of the American Railway Express. Further on he gives us the total revenues from twelve companies under the "local" express plan for the year ending June 30, 1918, as about \$139,000, and for the year ending June 30, 1919, as approximately \$200,000. These figures indicate either that these lines are not doing a large enough volume of business or else their rates are ridiculously low.

Mr. Munton quotes some lines as believing that it would not be profitable to institute the "pick-up-and-deliver" form of express. With those who so reported I beg to take issue. True, very little revenue is derived from those places we term as "hamlets," yet this is true of other forms of transportation, because the business is not there to be had by any form of transportation. Yet we believe that it is well to have a uniform method of doing this, as well as any other part of our business, at every station, whether great or small.

Let me quote briefly some figures from the electric package service on our line. During the month of October, 1919, the pick-up-and-delivery service yielded a gross income of \$54,385, the operating expenses being \$18,413. The net revenue was \$35,971, and this on a mileage of about 160 miles. We have an interstate service (carload) between Akron and Canton, Ohio, on the N. O. T. & L. Ry. to Detroit, Mich., using motors and trailer, leaving Akron about 6 p.m. every day in the week, Sunday excepted, and arriving at Detroit about 9 a.m. the following day. The rate per hundred-weight for this service is, from Canton \$1.35 and from Akron \$1.25. Our proportion is 60 cents, the remainder going to the other lines interested. This service has proved satisfactory to the shipper and profitable to us. I might add that there is no delivery beyond the station at Detroit.

I feel that there is little chance of success or satis-

*Abstract of paper presented at meeting of Central Electric Railway Association, Grand Rapids, Mich., Dec. 4-5, 1919.

faction in the matter of long-distance express service unless through service be established, and even in this event the utmost care must be exercised that no unnecessary delays in transit occur. It is better not to accept consignments than to disappoint the consignor and consignee and discourage them to the extent that they feel like withdrawing even the local shipments. It is not so much the cost of shipment as it is service.

I do not believe that it is a wise thing to use limited trains for merchandise shipments, because if any considerable tonnage is handled there must necessarily be delays at stations, and for patrons of limited trains nothing is more annoying than delays. Oftentimes they are content to be moving slowly—but they do want to be moving.

I agree with the author of our paper today in most he has said, and especially in that we must be constant in our efforts to bring added revenue to the coffers of our respective properties. Let us not allow the sentiment to die with this meeting.

Obstacles to Electric Express*

Slow Running Time and Many Interchanges Are Cited as Difficulties to a Comprehensive System

BY CHARLES J. LANEY

Traffic Manager Northern Ohio Traction & Light Company

FOR sake of argument, let us take issue with Mr. Munton's paper and point out some reasons why this is not the time that the organization of an electric railway express company would be a profitable venture nor beneficial to all interurban lines that operate in the Central Electric territory. It is true that the pick-up and delivery feature added to our freight departments would attract additional business to some of the larger roads, but I cannot see that the organization of an electric railway express would be the final answer on account of the numerous small electric lines that make up the routes between large commercial centers. These small lines are not financially able to maintain the equipment and service necessary to make the electric express a financial success. The proportion of rate that the small lines would receive would not compensate them to the extent of warranting the financing of any new project.

In establishing the electric railway express the chief factor in its success, after all of these operating conditions are made uniform, is competition with the old line express companies or the steam roads. Mr. Munton has pictured to us several trunk-line arteries that would make the electric railway express the main line to be fed by small intersecting interurban lines. Let us take his first route, and analyze the operating conditions.

Cleveland to Pittsburgh

Cleveland to Ravenna via the Northern Ohio Traction & Light Company, 48 miles, time, three and one-half hours, on account of the slow operation in Cleveland and through Akron. The Cleveland, Alliance & Mahoning Valley from Ravenna to Warren, 28 miles, one hour. The Mahoning & Shenango Railway & Light Company, Warren to Youngstown, 16 miles, time, one hour. The Youngstown & New Castle Railway, Youngstown to New Castle, 15 miles, one hour, where a connection is made with the Pittsburgh-Harmony Line, and all express

matter must be transferred because that line has a 5-ft. gage. If one hour is allowed for transfer and three hours to Pittsburgh, we have consumed ten and one-half hours and operated over five roads.

The time of the old-line express company over the Pennsylvania between Cleveland and Pittsburgh is three and one-half hours. Now, what is the answer? The shipper will not recognize the electric railway express on this trunk line.

Cleveland to Cincinnati

The Big Four Railroad operates a direct line from Cleveland to Cincinnati, a distance of 253 miles, in seven hours. The electric route is as follows:

Cleveland, Southwestern & Columbus Railway to Bucyrus, 113 miles, six hours.

Columbus, Marion & Bucyrus to Marion, 18 miles, forty-five minutes.

Columbus, Delaware & Marion to Columbus, 51 miles, two and a half hours,

allowing thirty minutes for loading and unloading at Delaware. At Columbus we should allow at least one hour for loading and unloading.

Ohio Electric Railway to Dayton, 75 miles, three hours, where we should allow one hour for loading and unloading.

Cincinnati & Dayton Traction Company to Cincinnati, 45 miles, two and three-fourths hours, allowing thirty minutes for loading and unloading at Hamilton.

This is a total of 322 miles, time sixteen hours fifty minutes, and then the cars arrive only at the city limits of Cincinnati.

What is the answer to this route? These two trunk-line routes cannot be changed to speed up an express service on account of physical conditions, and individual policies of the separate lines, due to different managements. These conditions, to a certain extent, will obtain on the other trunk-line routes mentioned by Mr. Munton.

WILL CONDITIONS BE MORE FAVORABLE LATER?

We cannot compete with steam road operation on long-haul express service. You will say that the unsatisfactory operation of steam roads through federal control and the embargoes and delays of express matter by the old-line express company make this the opportune time for the electric railways to establish their own express system.

When the steam lines and express companies return to their separate owners, which will be in a very short time, the traffic departments of those companies will effect a new organization, and as a result competition will be keener, and every pound of freight and express matter will be solicited and the public be advised of electric railway difficulties.

Mr. Munton points out that he has been advised that it would not be necessary to establish a pick-up and delivery service in all of the towns and probably in only the large commercial centers.

If you establish the electric railway express and are in competition with the old-line express companies, you must place in effect the same service as they offer or you won't get the business.

After all, the public regards express service as that having the pick-up and delivery features at origin and destination, together with quick dispatch.

There is in existence an agency which handles express matter on electric lines only, known as the Electric Package Agency, which operates on all interurban lines, except one, diverging from Cleveland. This is not an electric railway express company, incorporated and hav-

*Abstract of paper presented at meeting of Central Electric Railway Association, Grand Rapids, Mich., Dec. 4-5, 1919.

ing power to make contracts, but an agency operated by five lines on a co-operative basis and is a success financially to the roads for whom it acts as agent. It was established twenty years ago as the only freight carrying method of the interurban roads radiating from Cleveland.

It is a success because its business is a part of each road, its executive committee being the general manager of each road represented. The electric package revenue of each road is the earnings of each road after operating expenses have been deducted. So you can see that it is a department, so to speak, of each road represented.

Investigation was made several years ago, and it was found that the income to one road of this agency was more than the equivalent of 50 per cent revenue contract with the old-line express company. This agency is so operated at the present that I doubt very much if a contract offered by any electric express company would be attractive enough to discontinue its operation.

In the State of Michigan where three roads constitute the bulk of the electric railway mileage, the electric express might probably be profitable. Indiana could possibly operate such an express company on its large lines, but to take in the whole Central Electric territory I agree with Mr. Munton that if it were possible to combine and centralize the management of all interurban lines under four or five heads, then the electric railway express would be an added source of revenue on account of broader policies obtained and co-ordinated transportation service. Until then I cannot see where the small roads, operated by existing policies and under individual local conditions, will be benefited financially by the establishment of an electric railway express.

Possibilities of Express Business*

Expand Express Business to Include Fast Freight and Baggage Service, Both with Pick-up and Delivery

BY S. L. VAUGHAN

Traffic Manager, Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich.

LET us see when the express business first came into being. In 1839 William Harnden started in the business between New York and Boston. He arranged with the railroad and steamship lines to carry his messengers and their packages, and soon after extended his service between New York and Philadelphia. By 1850 he was operating in some of the Southern states. In 1840 Alvin Adams started in to compete, and in 1854, through a consolidation of four small companies, the Adams Express Company came into being. The American Express Company came into existence in 1850, and Wells Fargo & Company started in 1852. In April, 1915, the mileage of steam road, electric road, steamboat lines and stage lines in the United States covered by the express companies was 290,000 miles, 50,000 miles of which was steamboat, electric railway and stage. The Great Northern and Northern Pacific Railways have express companies in their own organizations.

SERVICE ON ELECTRIC LINES

Of course, we are most vitally interested in Michigan, Ohio and Indiana. I am known among a great many of

my shipping friends as "Express service at freight rates," for the reason that in times past that was my slogan in advertising my freight service, both locally and to and from Chicago and Milwaukee. I am not using that slogan now, but I really believe we are doing as well as the express companies, in time and service, for the rates paid. The terminal service of our new company is one of the problems to be worked out. I believe that we should have freight at certain rates as now, which the consignor delivers to us and the consignee calls for; another class high enough to cover the cost of pick-up and delivery between slow freight and the higher express or passenger train rate. The middle class would meet our truck competition. We are handling now, every night out of Muskegon on freight train at freight rates, shipments that leave Grand Rapids at 11:30 p.m. via express on the Michigan Central. You will ask the reason. Because the last express train on the steam road out of Muskegon is at 3:30 p.m.

In April, 1909, we made a contract with the American Express Company to handle its business between Grand Rapids, Grand Haven and Muskegon; the Adams was operating on the Grand Rapids & Indiana and Grand Trunk Railways. Our first-class freight rate at that time was 17 cents per hundred and our contract called for 25 cents per hundred. The first nine months our earnings on this business were \$243; the first year, 1909, \$835; in 1910, \$2,074; in 1911, \$3,843; in 1916, \$11,491; 1917, \$20,578. In 1918 for the first six months (the contract was canceled on July 1) our earnings amounted to \$11,506. We want this business back! How can we get it?

As a comparison, I must not overlook our local express business at the present time. Our rates are 75 cents for a package weighing 1 lb. to 100 lb. between any stations. The earnings on this business for six months ending Oct. 30, 1919, were \$1,584, not much in comparison to our earnings on the American Express. It has been hinted that there is no excuse for express companies as an organization, because, as they now exist, they are a wheel within a wheel, and the express business should be handled by the railroads.

COMPETITION FROM PARCEL POST

A strong competitor of the express business is the parcel post, a great amount of which consists of shipments which formerly were handled as freight on which the electric lines received regular freight revenue and which now fill up our space as parcel post, on which the revenue is very small. We are compelled by law to make it possible for a competitor to use our service at a much less revenue than we derive from our regular freight business. Let us get the parcel post and mail into the express classification.

Parcel post was established on Jan. 1, 1913, and limited to 11 lb. In August, 1913, the limit was increased to 20 lb., in 1917 to 50 lb. and in 1918 to 70 lb., so you will see that the government is engaged in the express business under an assumed name.

Another line of work for the Electric Railway Service Company, which I think might be made very profitable and I am sure would be appreciated by the traveling public and not hard to accomplish, would be the picking up and delivering of baggage from the house in one city to the house in another. Think this over as a new asset.

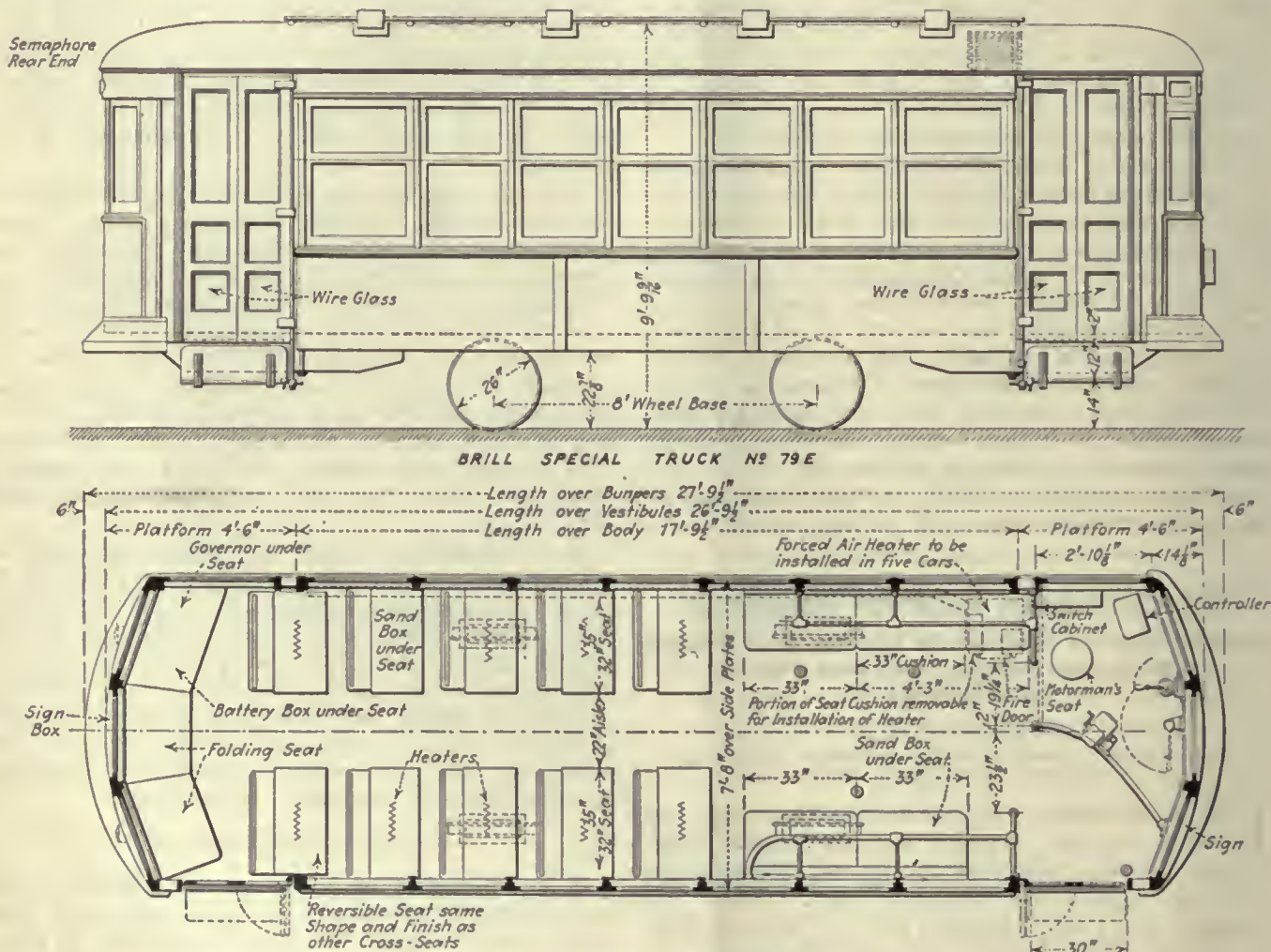
*Abstract of paper presented at meeting of Central Electric Railway Association, Grand Rapids, Mich., Dec. 4 and 5, 1919.

Changes in Kansas City Safety-Car Design

Sixty-five Cars Which Are Soon to Be Delivered Will Differ in Some Details From Those Now in Service

REFERENCE has been made several times in the columns of the ELECTRIC RAILWAY JOURNAL to the installation of twenty-five safety cars at Kansas City, to the success of their operation and also to the changes which were to be incorporated in the design of the sixty-five new cars now on order. Plan and elevation drawings for these sixty-five cars, delivery

one side and 5 ft. 6 in. long on the other have been placed at the front end. It is believed that this arrangement will help to eliminate congestion at the entrance and exit. Because of the hilly condition of Kansas City stanchions for the use of standing passengers are placed in front of the longitudinal seats. These stanchions are made of aluminum as is also the railing which prevents passengers from crowding the motorman and interfering with the operation of the car. The usual type of seat has been replaced by a cushion seat, the cars will have inside sheathing and there will be headlining. It is believed by the arrangement that these alterations will increase the



ELEVATION, FLOOR PLAN AND INTERIOR ARRANGEMENT TO NEW KANSAS CITY SAFETY CARS

of which was expected to begin about Nov. 20, are given here and will indicate the interesting changes which have been made.

Mentioned briefly a few of the alterations from the previous design include the use of a 28-in. rather than a 26-in. wheel. The distance of the first step above the rail is reduced from 16 in. to 14 in. by placing wheel housings under the seats and by the use of a very slight ramp in the floor of the front platform. Some of the structural members have been strengthened by the use of gusset plates and additional cross-bracing. The front and rear decks have been slightly altered so as to cover the bumpers and thus prevent passengers from riding thereon. The truck bolster bearing arrangement has also been changed.

As for inside details the seating arrangement has been changed so that longitudinal seats 7 ft. long on

comfort afforded to the passengers and make the cars more attractive to the public.

It will be noted from the drawings that provision has been made for a stove heater at the front of the car. It is planned to make a trial of such heaters on five of the cars while the remainder will each utilize twelve electric heaters. The length and width of the standard safety car has been maintained but the Kansas City car will weigh approximately 16,000 lb.

From 500 to 600 lb. additional has been placed in the underframing and the coupling arrangement has been changed so that the coupler is concealed. A 5-in. channel has been added to either end of the car for a bumper instead of the original 3-in. bumpers and a covering of thin sheet steel has been added to prevent boys from riding on the rear of cars as they did with the previous type of construction.

Philadelphia Conditions Analyzed

City Director of Transit Twining Criticises Recent P. R. T. Proposals and Discusses the Five-Cent Fare Situation in That City—Comparative Figures Are Given with Previous Years and Other Cities

ON NOV. 14, City Transit Director William S. Twining of Philadelphia presented an extended report to the joint Councilmanic committees of finance and street railways, giving his reasons for opposing the leasing of the city's Frankford elevated railway to the Philadelphia Rapid Transit Company and the proposed amendments of the 1907 contract. In this report, Director Twining includes a discussion of the 5-cent fare situation in Philadelphia which has attracted so much attention recently. On this point he said, in part:

DISCUSSION OF SERVICE AND FARE

"Mr. Mitten declared before the Federal Electric Railways Commission in Washington that 'co-operative effort is here found adequate to overcome obstacles seemingly insurmountable elsewhere.' As showing evidence of such effort he has stated, 'passengers carried per trainman increased 120 per cent—1910 to 1919. Public patronage increased from 288 to over 400 rides per capita.' Number of trainmen employed decreased 15.6 per cent. Total passengers per annum increased 72.3 per cent. Maximum number of cars operated increased 17 per cent. Passenger receipts per revenue car-mile increased from 27.2 cents to 38.4 cents, or 42 per cent. If we analyze these data we find the key to the 5-cent fare.

"Let us take the 120 per cent increase since 1910 in passengers carried per trainman, which Mr. Mitten points out as showing efficiency of management and co-operation of the trainmen. This increase in Philadelphia can be ascribed to the following changes:

"1. Larger, more modern and inviting cars. The average number of seats per surface car operated in 1910 was approximately thirty-four. At present the average is approximately forty-seven and one-half, an increase of 40 per cent.

"2. Increase in average speed of cars from 8 m.p.h. to 9 m.p.h. This increase in average speed was accomplished by cutting down the lay-over time and running time, the skip stops, etc.

"3. Elimination of lines of light traffic, thus raising the average of the other lines. Some of these lines are Race and Arch Streets lines, Callowhill Street line and Green Street and Fairmount Avenue line. Besides the elimination of these lines, in many cases routes were shortened and free transfer privileges given in lieu of the former direct route. This device contributes to the reduction in the average rate of fare, upon which Mr. Mitten has laid so much stress in his recent statements.

"4. Arrangement of runs and tripper service so as to reduce the total number of trainmen employed to a minimum.

"5. Rerouting and turning back of lines and withholding of service so as to reduce car mileage to a minimum. The expense of operation and therefore the net income vary quite naturally with the number of cars operated and car mileage; therefore, if the service be

deficient in any particular, the net income as reported will be higher than it should be. The comparison of cars operated and car mileage in Table I bears upon this question:

TABLE I—SHOWING CARS OPERATED AND CAR MILEAGE IN PHILADELPHIA

Years	Gross Earnings	Per Cent Increase Over 1913	Normal Max. Cars Operated	Per Cent Increase Over 1913	Car-Miles Passenger Service	Per Cent Increase Over 1913
Year to June 30:						
1913.....	\$23,927,179	.....	2,101	.....	82,941,432	.....
1914.....	24,255,813	1.37	2,126	1.19	82,911,808	0.04
1915.....	23,843,606	†0.35	2,019	†3.90	79,598,337	†4.03
1916.....	25,839,344	7.99	2,072	†1.38	80,184,402	†3.32
1917.....	28,553,614	19.34	2,215	5.43	84,058,042	1.35
1918.....	30,443,951	27.24	2,172	3.38	84,918,481	2.37
Year to Dec. 31:						
1918.....	31,704,428	32.50	2,174	3.47	84,892,061	2.35
1919*	35,000,000	46.28	.....	.....	87,000,000	4.89

* Partly estimated.

† Decrease.

"This shows that while street railway travel has increased about 46 per cent since 1913, the company has increased its service only 5 per cent.

TABLE II—GROSS REVENUE AND INCREASE PER ANNUM PHILADELPHIA RAPID TRANSIT COMPANY

Years Ended June 30	Gross Revenue	Annual Increase	Per Cent Increase Over Preceding Year	Average Per Cent Increase Since 1903	Average Per Cent Increase Since 1915
1903.....	\$15,436,573	.....	.....	.....	.....
1904.....	16,096,363	\$659,790	4.27	4.27	.....
1905.....	16,374,626	278,263	1.73	3.00	.....
1906.....	17,711,599	1,336,973	8.16	4.72	.....
1907.....	18,292,080	580,481	3.28	4.36	.....
1908.....	18,557,503	265,423	1.45	3.78	.....
1909.....	18,797,993	240,490	1.30	3.36	.....
1910.....	18,501,357	396,636*	1.58*	2.66	.....
1911.....	21,529,469	3,028,112	16.37	4.36	.....
1912.....	22,700,692	1,171,223	5.44	4.49	.....
1913.....	23,927,179	1,226,487	5.40	4.58	.....
1914.....	24,255,813	328,634	1.37	4.29	.....
1915.....	23,843,606	412,207*	1.70*	3.79	.....
1916.....	25,839,344	1,995,738	8.37	4.15	8.37
1917.....	28,553,614	2,714,270	10.50	4.60	9.43
1918.....	30,443,951	1,890,337	6.63	4.73	8.50
1919.....	33,730,414	3,286,463	10.78	5.12	9.07

* Indicates decrease.

"6. A change in the riding habit of the public due to the great changes in living conditions, making people ride more often, thus creating loading of cars at all hours. It is stated by the company that the rides per capita upon its system had increased from 288 in 1910 to more than 400 at present; in other words, each man, woman and child rode on an average 400 times in 1919 against 288 times in 1910. Besides this big increase in the riding habit, the population itself has been greatly increased since 1910. The company has not provided the facilities and service to keep up with this rapidly growing traffic (see Table I), and it is a fact that the overloading of cars is just as acute as in 1910, when Mr. Mitten 'found a lot of junk on the streets.'

"A traffic count of the loading of the company's cars taken during the Christmas rush of 1910 shows that of the passengers carried out of the central business district 45 per cent were required to stand. A similar count in October, 1919, shows that 40 per cent of the riders stood. This percentage will, of course, be in-

creased during the Christmas rush of the present year. Rush-hour loading conditions, therefore, are little better now than during the heaviest period of 1910, when conditions were notoriously deplorable. The large number of passengers who are required to stand during the non-rush hours of the day is a noticeable feature of present loading conditions. A comparison of loading conditions in 1915 and 1919 shows that the company is now carrying 44.7 per cent more passengers out of the business district during the maximum evening rush hour with only 14.5 per cent more seats. The result is that while 24.5 per cent of the riders were required to stand in 1915, 40.1 per cent were required to stand in October, 1919.

"7. Counting of all double fares and transfer passengers twice. The data which the company has presented as to passengers carried average fare per passenger and rides per capita are based upon counting all free transfers, exchange, double fare and joint fare passengers twice and including employees riding free as passengers. Mr. Mitten in his answers to questions claimed that the 'average fare per passenger' has decreased from

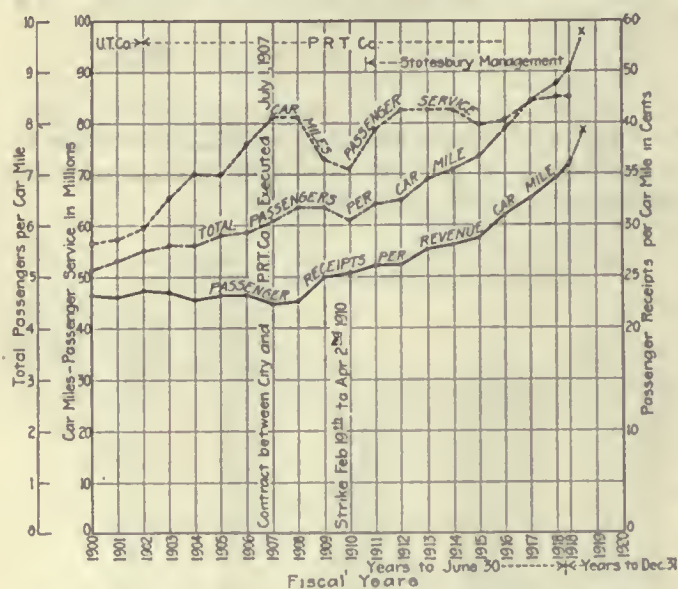


DIAGRAM SHOWING OPERATING STATISTICS OF PHILADELPHIA RAPID TRANSIT COMPANY

4.13 cents in 1910 to 3.98 cents at the present time, having dropped to as low as 3.91 cents in the years 1915, 1916 and 1917. He claims also that during this period the saving to passengers by this 'reduction in fare' amounted to \$7,941,983. These figures are of course entirely fanciful, as all know that the rates of fare are 5 and 8 cents and the average somewhat more than 5 cents. The calculation of a reduction in the 'average fare per passenger' from 4.13 to 3.98 cents is possible principally because a greater proportion of the passengers are now required to use two cars to reach their destination than in 1910. As a matter of fact, the average fare is higher now than in 1910, as shown in the following statement:

"In 1910, 333,253,830 passengers paid a 5-cent fare. In 1910, 97,846 passengers paid a 4.167-cent fare (six tickets for 25 cents). In 1910, 21,285,569 passengers paid an 8-cent fare. The average fare paid in 1910 was 5.18 cents.

"In 1918, 545,082,641 passengers paid 5 cents. In 1918, 43,791,710 passengers paid 8 cents. The average fare paid in 1918 was 5.223 cents.

TABLE III—COMPARISON OF TRAFFIC AND FACILITIES ON ALL SURFACE AND SUBWAY-SURFACE LINES OPERATED IN BUSINESS DISTRICT FOR MAXIMUM HOUR (EVENING RUSH) IN YEARS 1915 AND 1919

	North Philadelphia Lines	South Philadelphia Lines	West Philadelphia Lines	Total All Lines Operated in Business District
Passengers:				
1919.....	59,363	29,734	21,049	110,146
1915.....	39,911	20,373	15,776	76,060
Increase, 1919 over 1915, per cent.	49.0	46.0	33.5	44.7
Cars:				
1919.....	758	345	256	1,376
1915.....	611	310	240	1,161
Increase, 1919 over 1915, per cent.	24.0	11.3	6.7	18.5
Seats:				
1919.....	37,160	16,972	12,916	65,748
1915.....	29,768	15,464	12,173	57,405
Increase, 1919 over 1915, per cent.	24.8	9.6	6.2	14.5
Passengers per seat:				
1919.....	1.60	1.75	1.63	1.67
1915.....	1.34	1.32	1.30	1.33
Increase, 1919 over 1915, per cent.	11.9	32.8	25.5	25.5
Per cent of total passengers not provided with seats:				
1919, per cent.....	37.5	42.8	38.6	40.1
1915.....	25.4	24.2	23.1	24.5

Data from Street Corner Observations by Department of City Transit in May 1915, and October, 1919.

"In order to determine the amount of service being rendered to the riding public upon the Philadelphia Rapid Transit Company's surface system the Department of City Transit has made observations which are of interest, especially when compared with similar observations of previous years. These observations have been taken in the evening rush period and include all routes operated in the business district. Since the maximum traffic hour is included in this period a comparison of the facilities and traffic of the system under peak load may be made.

"The total number of passengers carried from the business district during the maximum hour in May, 1915, was 76,060. They were transported on 1161 cars having 57,405 seats, hence 18,655 or 24.5 per cent of the total passengers were standees. In October, 1919, the total number of passengers carried from the district had become 110,146 in the maximum hour, an increase of 44.7 per cent over 1915, while the number of seats provided increased from 57,405 to 65,748, or only 14.5 per cent. It is therefore evident that the rate of increase in traffic has been about three times the rate of increase in service. The number of standees in 1919 has mounted to 44,398, which is 40.1 per cent of the total riders. These figures serve to show the decrease in the amount of service per passenger over a period of the present management of the company.

"It is also interesting to compare the present maximum conditions with those existing under the former management in 1910, when conditions were generally declared deplorable and have been repeatedly made example of by the present management.

"In the report submitted to the Pennsylvania State Railroad Commission by Ford, Bacon & Davis after investigation of the system compelled by numerous complaints, comparable figures are given. (Vol. II, page 143). This report shows the results of a traffic count taken from Dec. 19 to 23, of 1910. These figures therefore represent conditions existing during the Christmas rush, the heaviest traffic period of the year. The number of passengers carried from the business district during the maximum evening hour was 58,841 and the number of seats operated 29,220, and thus the number of standees was 24,621, or 45.7 per cent of the total passengers. It is therefore shown that with the present ratio of 40.1 per cent of passengers standing, the car-

loading conditions during the maximum rush hour are little better than those existing during the heaviest period of a year when the service was deplorably deficient."

COMPARISON OF INVESTMENTS IN TRANSIT FACILITIES, PHILADELPHIA AND BOSTON

In commenting on the question of capital investment in transit facilities, Mr. Twining points out that the Philadelphia Rapid Transit Company from Jan. 1, 1911, to June 30, 1919, had invested capital to the extent of \$21,500,000, of which about \$2,500,000 has been in rapid transit, while during approximately the same period (July 1, 1910, to Dec. 31, 1918) the Boston Elevated Railway increased its capital investment by \$35,129,610, of which \$31,401,014 was for rapid transit facilities. From the tabulation of these data, Mr. Twining points out that a comparison of the increased revenues and additional capital investment in transit facilities in these two cities would be as shown in Table IV.

TABLE IV—SHOWING COMPARISON OF INCREASED CAPITAL TO INCREASE IN GROSS REVENUE, BOSTON AND PHILADELPHIA

	Increase in Annual Gross Revenue, 1910-1919	Increased Capital on Facilities Invested in Supported Gross Revenue	Ratio of Increase in Investment in Facilities to Increase in Gross Revenue
Boston Elevated Railway.....	\$5,081,985	\$35,129,110	\$6.91
Philadelphia Rapid Transit Company..	12,200,945	21,475,000	1.76

Continuing, Mr. Twining said: "It is seen from the above table that in Boston the investment in the period has averaged \$6.91 for each dollar of increase in revenue. while in Philadelphia the Philadelphia Rapid Transit Company has invested only \$1.76 for each dollar of increase in revenue. On the basis, therefore, of increase in revenue, the Boston investment has been at a rate nearly four times as great as Philadelphia Rapid Transit.

"If the Philadelphia Rapid Transit Company had provided capital at the rate shown above for Boston, the investment for the period instead of being \$21,475,000, would have been more than \$80,000,000, and the fixed charges upon the additional \$60,000,000 at 5 per cent would have been \$3,000,000 per year. The addition of \$3,000,000 to its present fixed charges would make operation upon a 5-cent fare impossible. Besides increasing the fixed charges, the operation of the added facilities would have been accompanied by increased operating expenses. These might have been easily as much as \$6,000,000 per year, or a total of \$9,000,000, requiring the company to earn \$44,000,000 this year and calling for a fare of at least 7½ cents, assuming no loss of riding from increase of fares.

"This comparison shows conclusively that the 5-cent fare in Philadelphia is due to an almost complete stoppage of transit development as compared with Boston and other large cities.

THE EFFECT OF DEAD CAPITAL ON THE FARE

"In my judgment, public utility companies should keep the total amount of borrowed money in the business at all times as low as possible and should be forced to divide all surplus earnings which result from a reasonable rate of fare between a dividend fund and an amortization fund. By the action of such a fund the cost of service should require the minimum proportion of the fare for the support of the capital. That I am not

alone in this view I quote from a recent article by Prof. Dexter Kimball:

"We are now beginning to look upon industry as a means to support human life, not as a source of private, corporate or State profit."

"Judge Gray, of Massachusetts, in 1869 expressed the same view in regard to the functions of street railways as follows:

"The accommodation of travelers, of all who have occasion to use them at certain rates of fare, is the leading object and public benefit for which these special modes of using the highway are granted, and not the profit of the proprietors. The profit to the proprietors is a mere mode of compensating them for their outlay of capital in providing and keeping up this public easement."

"All capital invested in obsolete or superseded apparatus or equipment should be amortized, and only such money as is now active in the carrying on of the business should be entitled to draw interest or dividends. In other words, dead capital, like the superseded equipment, should not burden a public utility business and hamper the working capital. In the Philadelphia Rapid Transit Company much equipment and apparatus—horses, cars, rails, etc., purchased and their cost capitalized during the horse car, cable car and early electric periods, have long since disappeared, but the capital

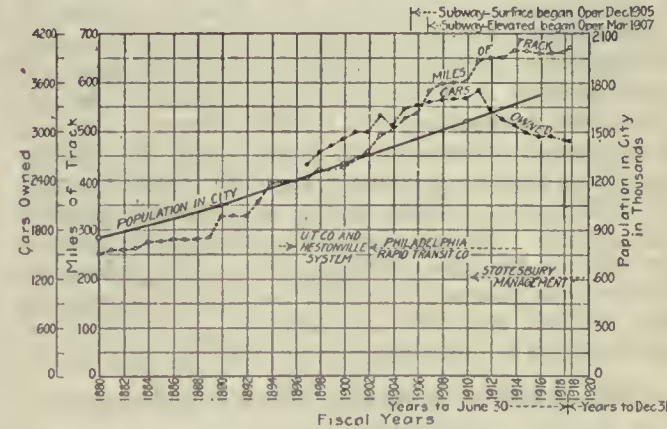


DIAGRAM SHOWING POPULATION OF PHILADELPHIA AND MILES OF TRACK AND CARS OWNED BY P. R. T.

invested in those discarded facilities, although actually dead and representing nothing but a memory, still rides on the back of the capital now working. The active capital is forced not only to earn its own interest but must carry a load of dead capital besides. In the Philadelphia Rapid Transit Company's capitalization there exists today at least \$40,000,000 of dead but unamortized capital drawing from the net earnings of the system an average of at least 10 per cent, or \$4,000,000 annually. Is it any wonder that the company finds it difficult to increase its working or active capital when the old capital must be given its pound of flesh before the new and active capital can be fed. In addition to being inactive capital, a part at least of the Philadelphia Rapid Transit capitalization is what is known as 'water.' This only aggravates a bad matter, and with this load, whether it be dead capital or water, the company finds itself unable to support the necessary capital burdens which the increasing traffic demands. New capital can only be supported by unencumbered profits, and such profits are now exceedingly speculative on 5-cent fares.

"Since Mr. Mitten came here eight years ago, he has

discarded at least 1000 cars, six or more power plants, five battery substations, carhouses and considerable mileage of track and distribution system, amounting in the aggregate to several millions of dollars, but aside from comparatively small renewal appropriations, this capital invested by the underlying companies still draws the same return as when this equipment was active and used in the service of the public.

"The reason why the company must ask the city to buy up its exchange business, why the contract-lease was rejected by the Public Service Commission and why so much difficulty is contemplated in arriving at a new lease, is because the company's capitalization has been allowed to pile up, property deteriorate and disappear without the establishment of depreciation or amortization funds and a pyramid of leases built up which, for 999 years, make the superseded property more potential in controlling the company's service and fares than the property now used in public service."

Mail Pay Hearings in Washington

Interstate Commerce Commission Listens to Arguments For and Against Increase of Payment to Electric Railways

FINAL argument was heard at Washington, D. C., on Dec. 5 by the Interstate Commerce Commission in the appeal by the electric railways for additional compensation for handling the United States mails. The American Electric Railway Association was represented by S. S. Ashbaugh. The post office department was represented by Joseph Stewart. In all, there was an attendance of twenty-eight, but the appearances except for counsel were not formally noted. All of the commissioners except Mr. Eastman were in attendance. The morning was given over to the presentation of the case of the railways. At 2 o'clock the session was resumed with Mr. Stewart presenting the case for the Post Office Department. After he had concluded, Mr. Ashbaugh was heard in rebuttal.

MR. ASHBAUGH EXPLAINS RAILWAY'S POSITION

In opening Mr. Ashbaugh referred to the very serious condition which confronts the electric railways and cited a number of specific cases. He also referred to the general social unrest. He said that the proceeding in which he appeared was not an ordinary lawsuit. It was a congressional hearing. Congress had found the Interstate Commerce Commission in existence and had referred the matter to it for settlement. Mr. Ashbaugh said that carrying the mail was a government obligation. It was not a matter of contract. The electric railways felt themselves unjustly dealt with, but they had not begun suit because they desired to keep the matter out of the courts. The railways were not obliged to carry the mails at a loss. The pay they received for carrying the mails was a matter of negotiation. The statute of 1918 did not increase the Interstate Commerce Commission powers, but merely modified the penalties with respect to refusal to carry mails. He said the jurisdiction of the Commission was fixed (1) by statute and (2) by the act of the Postmaster General in 1896. Mr. Ashbaugh made no complaint against any individuals. He did not impugn anybody's motives. As regards parcel post, Mr. Ashbaugh said that parcel post limits were fixed by law at 11 lb., but that under his discretionary powers

the Postmaster General raised the limit to 70 lb. Mr. Ashbaugh questioned the postmaster's authority to do this. He said, however, that if the postmaster had this authority, then the Interstate Commerce Commission had some rights in the premises.

The mails carried on electric railways had never paid their way. The whole drift of the argument at the sessions held through the summer was that the railroads merely wanted fair play for a fair service. Mr. Bamberger at Salt Lake City had said that he would not consider mail service at present rate, but that he would gladly do so at fair rates and under proper regulations. This was the crux of the whole matter. In referring to a specific instance, Mr. Ashbaugh said that the Connecticut Company had stopped its railway mail service. That company had been paid \$6,000 a year by the government for the service, and the postmaster was now paying \$18,000 a year for the same kind of service by other means. Mr. Ashbaugh went into a long disquisition about the handling of mails in cities and the inconvenience which resulted to passengers. He said there was no authorization for side and terminal service, but that the electric railways had been called upon to perform a great deal of such work. This side and terminal service was much more costly to the electric railways than was similar service to steam railroads.

The Eastern Massachusetts Street Railway had been relieved of such work by the Post Office, but only because its men had threatened to strike. One of the commissioners asked if there would be any objection to side and terminal service if it was adequately paid for. In reply Mr. Ashbaugh said that the railways had no objections to performing this service if the companies had control of the work. The companies wanted only what they actually paid out for this kind of service.

Mr. Ashbaugh contended that the Post Office had burdened the electric railways by their appeal to farmers and others to ship by mail. In consequence, legitimate express business had been reduced considerably. Mail trains were used to put this class of matter through to terminals to the detriment of regular business of the railways. On passenger cars the electric railways were willing to carry three pouches of 50 lb. each. If the car facilities would permit, the companies would be willing to carry seven pouches. They were, however, opposed to carrying mail sacks during rush hours. The electric railways wanted to co-operate with the Post Office Department. Mr. Ashbaugh also cited the specific case of unreasonableness by the Post Office Department in Kansas City. In Indianapolis parcel post had been given precedence over all other matter, and the companies there had been deprived of the express business.

Mr. Ashbaugh said that the mails should be carried under reasonable regulations and the pay should be three times what it was at present. The electric railways wanted a rate for passenger cars covering the cost of operation plus a return on the equipment used in the service.

Baltimore, Kansas City and Omaha were the only cities that still had independent mail cars. An electric railway could not be properly paid at weight for a haul of, say, 1.5 miles. Mr. Ashbaugh said that to his knowledge copper, salt, sugar and other commodities had been shipped by parcel post, thus making the

service a nuisance to the railway. The specific rates of pay suggested by the electric railways were referred to on pages 57, and 59 of the brief of the railways. In Kansas City, the Kansas City Railways was paid \$25,000 a year for independent mail operation. Mr. Ashbaugh said that the cost for motormen and conductors alone in that city was \$5,000 or \$6,000 more per year than the operating income. For the year 1919, the electric railways asked retroactive pay at three times the present rate.

Mr. Ashbaugh pleaded for experimental service at the new rate for a period of six months. The electric railways were entitled to retroactive pay. In conclusion, Mr. Ashbaugh said that it was not worth the time of the electric railways to go into the matter if the brief of the Post Office Department represented what the department considered as a fair statement of its side of the case.

Exhibits bringing the matter down to the latest date were introduced as documents 156 and 157. The rates proposed by the Post Office Department viewed operating costs in the wrong way.

MR. STEWART SPEAKS ON BEHALF OF POST OFFICE DEPARTMENT

Mr. Stewart for the Post Office department reviewed the recent Post Office legislation. He said that the parcel post act had been passed by the Congress after a country-wide agitation. Congress knew what it was doing. The rates were fixed, and the conditions were generally known. The Post Office Department acted merely in an administrative way. All this legislation, however, was past history. The Post Office department was a servant of the people. The postmaster has some discretion, but he worked under the rules laid down by the statutes. No officer of the department so far as Mr. Stewart knew, had ever sought to justify the payments made to the electric railways. The policy of the department had been to relieve the companies of side and terminal service. In many cases the electric railways had appealed for relief to the local post office instead of going direct to the department. Mr. Stewart said that where appeal had been made direct to the department, the disposition was to correct the matter complained about.

At this point, Mr. Ashbaugh repeated that even where appeal had been made direct, relief had not been forthcoming. Mr. Stewart said there might be some such cases, but that the disposition of the department was to be fair. He admitted the absurdity of some of the present rates. When testimony was being taken throughout the country in the present case many things were disclosed that had not previously been known to the Post Office. According to Mr. Stewart there had never been a time when all the companies had come before Congress. In 1916 and 1918, however, Congress did act. At present the necessary machinery for a satisfactory adjustment of the matter is in existence.

Mr. Stewart then said there were three classes of service, city, suburban and interurban, and then described them and the basis of the present pay. He said there were 279 routes at the 3-cent rate and nineteen at the 4-cent rate. There was much misunderstanding about the 4-cent rate. He said that it would naturally appear that all lines would think they were entitled to the extra rate. Haulage must be very heavy and the number of points must be great to justify any

increase in rate. Nineteen electric railways were on the steam railroad rate basis of pay. The carrying of the mails was an incidental service to the electric railways. In fact, in most cases it was so incidental that it was usually coupled up with other service, such as freight. He said that some of the electric railways wanted steam railroad line rates, claiming similarity to steam railroad service. In this they were not justified. Mr. Stewart contended that the evidence of the carriers was persuasive and suggestive but not conclusive. He thought the reports on file with the Interstate Commerce Commission ought to be taken as a basis for cost rather than facts brought out at hearings. Defects were radically apparent.

The government was ready to take up side and terminal service. The department was also willing to co-operate with respect to the character of the mail. The Post Office had tabulated I. C. C. records for nineteen carriers that submitted general statements and had concluded that the figures of cost were too great. The matter of compensation by the Post Office department was one of deduction. If a loss were involved to the carrier in any particular case, the carrier should receive more. He did not think the commission had any retroactive authority.

In rebuttal, Mr. Ashbaugh said that the trouble with the conclusions of the Post Office Department was that it had taken such figures as would get a low rate and fortifying itself with testimony here and there, had come to the conclusion that the rates should even be reduced. It was difficult, he said, to determine the pouch compensation on passenger cars but it was not difficult to determine the compensation for the individual car. In Baltimore, Kansas City and Omaha, the companies operating individual cars paid out more for wages and actual operation than they receive as compensation, not taking into consideration overhead and other charges. It seemed to him that when the government had not offered any other testimony than that of Mr. Prentiss, apparently prejudiced, the Post Office had not proved its case.

ABSTRACT OF RAILWAY BRIEF WHICH WAS PRESENTED BY MR. ASHBAUGH

Mr. Ashbaugh in his brief, which consisted of seventy-nine printed 6-in. x 9-in. pages, reviewed the situation, covering in detail the issue involved, side and terminal service, pouch, sack and parcel post in both city and interurban service, cost of operation in city and interurban service and proposed compensation for services rendered. He also took up the cost of operation of independent and apartment car service and proposed new rates of compensation.

The electric railways as outlined in the brief—asked:

First. That the rule of the Post Office department—requiring the railway companies to perform side and terminal messenger service be wholly abrogated.

Second. That the Postmaster General be directed to pay to each electric railway such sums of money as have since July 1, 1916, been paid out directly by it in compliance with the order to perform such service, and to charge the same as a part of the expenses of the fiscal years respectively.

The basis and rates proposed and urged for pouch, sack and parcel post service on both city and interurban lines by the electric railways are:

Rate 1.—Closed pouch and sack service.—Basis to be three pouches or less on one passenger car, except by agreement with the railway. Each loose parcel if carried to be counted as one pouch or sack, each pouch or sack, or loose parcel over three, counted together, carried under agreement on one passenger car at one time, is to be transported at one-half the rates given per pouch. The minimum annual compensation for any route to be \$300.

Length of route	Rate per Pouch or Sack
Over 3 miles or less.....	20 cents
Over 3 and less than 6 miles.....	22 cents
Over 6 and less than 8 miles.....	23 cents
Over 8 and less than 10 miles.....	24 cents
Over 10 and less than 12 miles.....	25 cents
Over 12 and less than 14 miles.....	26 cents

For each additional 2 miles or fraction thereof, 1 cent increase per pouch.

Rate 2.—Parcel Post on Express and Freight Cars.—Rate to be 75 per cent of that proposed for closed pouch sack service on passenger cars. The limit of weight for any single piece to be 70 lb. The weights of pouches and sacks for Rates 1 and 2 shall not be more than 50 lb. and their dimensions shall not exceed—

Pouches (Cylindrical)	Sacks (Rectangular)
No. 2....15 x 36 in.	No. 1....11 x 19 x 32 in.
No. 3....12 x 30 in.	No. 2....11 x 18 x 20 in.
No. 4....11 x 22 in.	No. 4....8 x 18 x 15 in.

Rate 3.—Independent Cars.—A rate of 2.5 cents per linear car foot mile, plus an annual charge of \$500 per car was suggested.

Rate 4.—Apartment Cars.—A rate of 2.5 cents per linear car foot mile, plus an annual charge of \$250 per car was proposed.

Publicity Bureau Assumes New Duty

THE Illinois Committee on Public Utility Information which was inaugurated about April 1, 1919, under the auspices of the Illinois Gas Association, the Illinois State Electric Association and the Illinois Electric Railways Association, has been obliged to form a new department to meet requests for reliable public utility information from public schools, universities and colleges of the State, as well as from civic organizations, commercial clubs and public speakers. This department will furnish information dependable both scientifically and historically free of charge, but will take no part in controversies, or controversial subjects.

Since the formation of the committee all classes of public utility information has been collected and indexed for the use of the various utilities throughout the State, and a weekly bulletin has been sent out to hundreds of newspapers with the idea of keeping the public utility conditions constantly before the public, and through the columns of the newspapers to educate the public to the financial needs of the utilities and to the magnitude of these industries.

A series of informational bulletins is now being issued also for school purposes, and supplementing this the committee is having prepared authoritative brochures upon each branch of the utility industry. The school bulletins are being prepared with the idea that they may be used by debating societies and in English and current topic classes. The scope and importance of the work may be gaged by the fact that 345 public school principals in Illinois as well as universities and colleges have requested the Illinois Committee to send them copies of these bulletins.

Reinforced Suspension for Sheet-Steel Gear Cases

By Interlocking and Welding Together the Sides, Cover and Reinforcements, a Channel-Shaped Suspension Is Built Up To Provide Increased Strength

THE use of sheet steel for gear cases came into favor in the campaign that was started several years ago to reduce the weight of electric cars. Manufacturers of railway motors were anxious to comply with their customers' demands for lighter equipments, and the malleable iron gear case in use at that time appeared to offer a fruitful field for reducing weight.

In design and construction the sheet-steel gear case has presented problems that were not thought of with the old malleable iron type. A gear case for an electric railway motor must of necessity be overhung and supported from the end of the motor. The necessary



SPOT WELDING REINFORCEMENT TO GEAR CASE

brackets or lugs for effecting this support are subjected to severe shocks and stresses from the jolting of the car over crossings, special track work and track in run-down condition, and often receive severe blows from the pavement or roadbed when clearance is small. The severity of these conditions is the determining factor in the life of gear cases and they must be designed so as to withstand the most severe conditions.

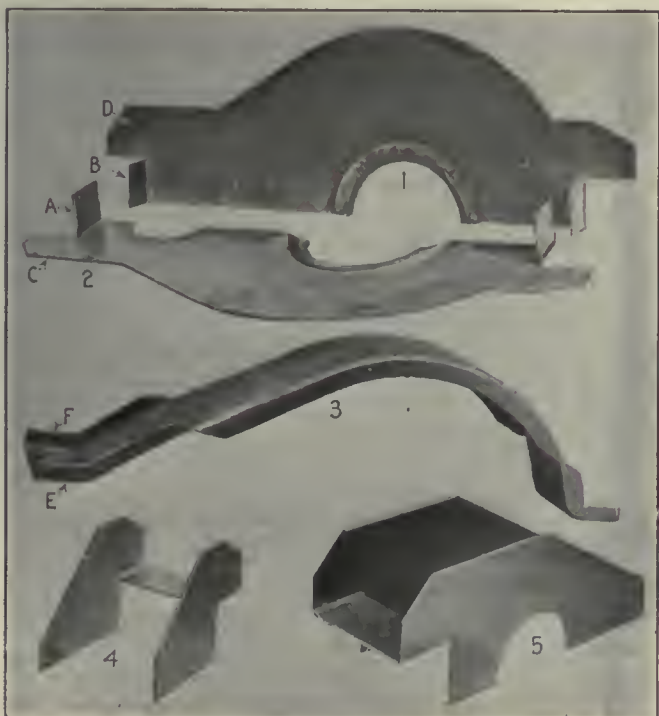
The method of suspension and the construction of the suspension members of gear cases have an important bearing on their ultimate life. The two-point end suspension which is now universally used with late-type railway motors, throws less strain on the gear case and its supports. This comes about through the increased flexibility provided for the case, effective if it should strike an obstruction, and through the elimina-



A COMPLETED GEAR CASE

tion of excessive lateral vibration. The accompanying half-tones show the latest type of gear case as constructed by the Columbia Machine Works & Malleable Iron Company, which illustrates the points made above. Several new features have been incorporated in its design to overcome the trouble of breakage at the points of support. Increased strength at these points is obtained by extending the sides and cover so as to form the suspension members and reinforcing these with sheet-steel brackets and plates so shaped as to interlock with the sides and cover. By spot-welding all parts together and by additional welding along the entire edges a strong construction is obtained.

All parts are punched from sheet steel and are then bent to the shape desired. The two sides of each half of the gear case are split at the suspension ends. The bottom parts of these end portions are turned inward



PRINCIPAL PARTS OF GEAR CASE

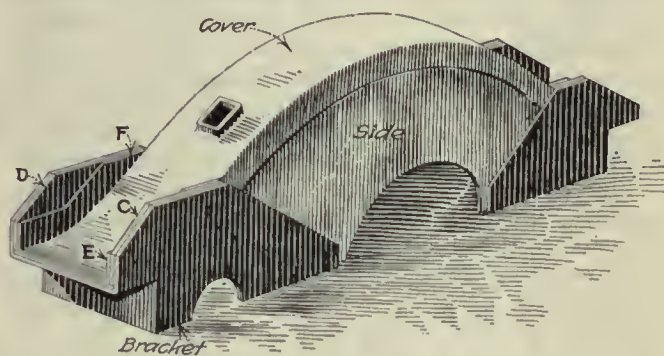
Nos. 1 and 2, sides; No. 3, cover; Nos. 4 and 5, reinforcements

as indicated at *A* and *B* in the illustrations. These turned-in portions abut against each other in the assembled case and increase the strength as well as effectively closing the ends to keep out dirt and water. The upper portions of the ends *C* and *D* are left extended so as to serve as supports for the case when assembled.

The cover is notched and bent so as to provide flanges in two directions along the edges. The flanges of the center portion extend down and outside the side members and are fastened to them by welding or riveting. At the ends the flanges are bent up as indicated at *E* and *F* and fit inside the sides.

As a reinforcement to this end construction of the sides and cover a bracket is employed which extends back along the sides of the gear case and crosses over underneath the end portion of the cover. This bracket is made in one piece as indicated in the accompanying illustrations. By splitting the bracket near the end, the sides are turned up leaving a channel shaped support as a reinforcement for the suspension. An insert plate is fitted across the end between the cover and the bracket so that three thicknesses of metal are provided at this point.

After the various parts are assembled and welded to-



DETAILS OF GEAR CASE

gether, the suspension ends of each half of the gear case take the form of a channel-shaped support which has three thicknesses of steel on each side and across the end. As the sides and top are extended to form this channel the weight of the gear case and any strains resulting from vibration or shock are transmitted through uninterrupted supports and not through joints which may loosen at seams or through the shearing off of rivets.

The construction of the suspension for the two halves of the gear case and for each end is substantially the same with the exception of the shape and dimensions of the parts concerned. Safety straps are provided at each end to support the lower half of the gear case should the nut come off the connecting bolt.

Volt-Ammeter for Signal Maintenance

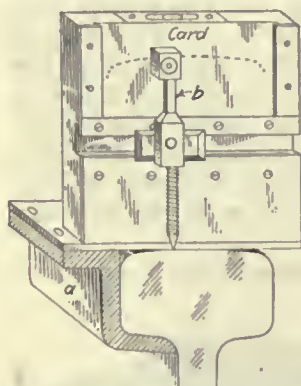
A new form of volt-ammeter especially designed for signal engineers, supervisors and other work where a highly accurate instrument is not considered warranted has recently been placed on the market. The Roller-Smith Company, New York City, has brought out such a little instrument, which weighs 20 oz. and is only 5 x 4 x 2 in. in dimensions. This is a direct-current instrument with uniform scale division, and "dead beat" needle characteristics. It has a simple zero adjuster and is entirely self-contained.

Making Accurate Measurement of Rail Wear

Description of an Instrument* to Provide a Means of Plotting the Outline of the Surface of a Rail While in Position in the Track

BY ALEXANDER D. FERGUSON
A. M. E. I. C.

DURING the appraisal of the properties of the Winnipeg Electric Railway and subsidiary companies, it was necessary to determine the depreciation of the tracks, especially in regard to rail wear. After a complete inventory of the track had been finished, it was decided that an accurate measurement of the wear should be made. This measurement was rendered particularly difficult as the rails were set in strong sets. To measure the rail wear accurately without necessitating the removal of these sets, the writer devised the instrument shown in an accompanying sketch, which consists essentially of a framework on which is mounted a vertical rod, the lower end of which is pointed and the upper end provided with a block for holding a pencil. Horizontal movement of this vertical rod takes place by



INSTRUMENT FOR RECORDING GRAPHICALLY THE SURFACE OF A RAIL

having a support which operates in a slot across the instrument. For holding the instrument in position a casting is provided at the bottom which fits against the underside of the rail head. A level gage at the top shows when the instrument is level.

The instrument is set, as indicated in the accompanying illustration, by means of set screws. A plain card is inserted in the card rack at the top of the instrument and a pencil record of the top of the rail section is obtained by moving the movable portion horizontally across the instrument, free vertical motion being had at the same time. The pencil records an exact tracing of the top of the rail as it is in the track.

This operation is repeated on a new rail section of the same weight as the one first measured, using the same card, so that the new rail surface will be superimposed on the first as indicated in the second illustration. The

are shown herewith and illustrate to a very marked degree the unexpected wear that is obtained in some cases, especially on curves.

This instrument has proved invaluable for appraisal work of this character, and the writer believes that its use would be of value to companies for making a record of track conditions over their systems. Such a record could be arranged to show the rail wear at certain specified points, and by taking these measurements at convenient intervals a record of the rate of rail wear would be obtained. A graphic representation of the condition of the track could also be arranged without considerable difficulty.

At present the instrument has been used only on T-rail sections, but it can be readily remodeled for use with girder sections.

Losses Due to Combustible in Refuse

AMONG the many valuable reference charts prepared by the engineers of the Westinghouse Electric & Manufacturing Company, particularly for use in connection with boiler-room practice, the accompanying illustration is very instructive in showing how the combustible in the refuse carries off energy that should be

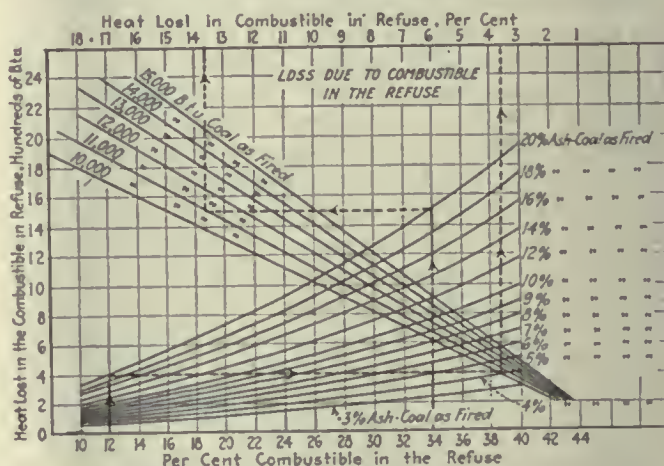
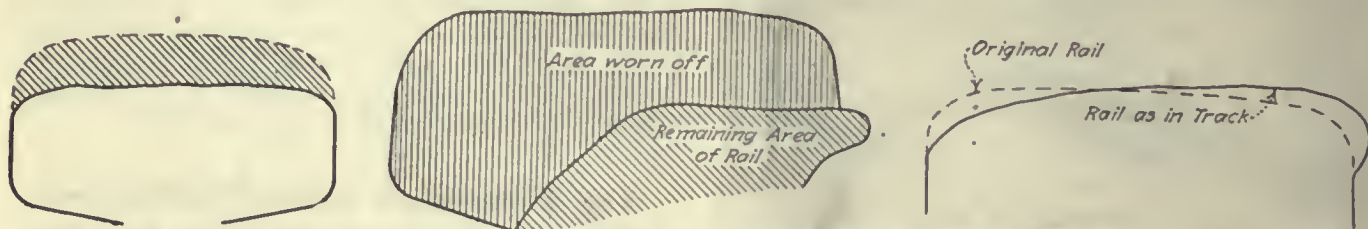


CHART FOR CALCULATING EFFECT OF ASH IN COAL

utilized. Two examples of the use of the chart are indicated by the heavy lines with arrow heads. In Case 1, starting with 12 per cent combustible in the refuse, and assuming 20 per cent ash in coal and 11,000 B.t.u. per pound in the coal as fired, the percentage of heat in the combustible works out as about 3.7. Similarly, 34



AT LEFT, REGULAR WEAR OF RAIL SECTION; CENTER, WEAR FOUND ON 70 LB. A.S.C.E. OUTER RAIL ON A CURVE; AT RIGHT, SECTION OF 60 LB. A.S.C.E. RAIL, SHOWING ROLLING ON OUTER PORTION

shaded area between these two lines represents the rail wear and a record of it can be accurately taken off by a planimeter.

In the course of making the measurements referred to, many interesting charts were obtained. Three of these

*Other similar types of rail head scribers were described in issues of the ELECTRIC RAILWAY JOURNAL for Nov. 20, 1915, page 1042, May 12, 1917, page 876 and March 22, 1919, page 592.—Eds.

per cent combustible in the refuse with the same coal shows 13.6 per cent of the heat to be lost in the combustible in the refuse.

The basis of calculation of the chart is this:

Let x = per cent of coal as fired, and also the weight of ash in 1 lb. of coal as fired.

y = per cent of combustible in refuse.

Then the per cent of ash in the refuse is $1-y$, and the ratio of combustible to ash is $y \div (1-y)$.

Since from 1 lb. of coal there is in the refuse a weight of ash equal to the weight of ash in the coal as fired (neglecting the ash carried over into the boiler) the weight of combustible in the refuse is

$$\frac{y}{1-y} \times x.$$

The combustible in the refuse may be considered as carbon, of which the thermal value is 14,550 B.t.u. per pound. Then the number of heat units lost per pound of coal is

$$\frac{y}{1-y} = x \times 14,550.$$

The per cent loss, referred to the coal as fired is

$$\frac{x \times y \times 14,550}{(1-y) \times \text{B. t. u. in coal as fired}}$$

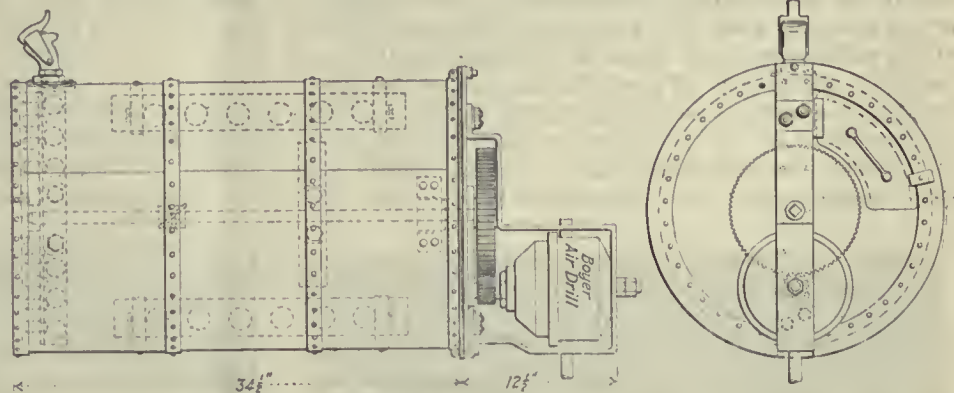
Paint Mixer Driven by Remodeled Air Drill

By Using a Self-Contained Device Driven by an Air-Drill Mechanism, Paint-Mixing Has Been Made Attractive in Brooklyn

THE mixing of paint for car painting is considered as a somewhat tedious job, especially when it is necessary to perform the various operations by hand. For several years the Brooklyn Rapid Transit Company has had paint mixers operated by central broached shafts upon which an ordinary controller handle was fitted to rotate the interior parts. These tanks were of sheet-iron construction with riveted bands, and were 34½ in. long by approximately 2 ft. in diameter. Their capacity is 50 gal. each. The construction of the interior stirring mechanism is shown in an accompanying illustration. Two baffle plates extend out from the sides of the tank. These are 23½ in. long by 3 in. wide and are perforated with 6 holes, 1½

in. in diameter. The center paddle shaft is 1½ in. square, except at the points which are used as bearings at the top and bottom. The bottom is turned down to 1 in. diameter and rests in an angle iron support. The top bearing is 1½ in. diameter, and consists of a hole in a flat piece of strap iron. The center paddles are mounted on this shaft and the construction of the center portion is arranged to clamp the square part of the shaft firmly.

As already stated, the first construction of these paint mixers provided for hand operation by the use of an ordinary controller handle. In an endeavor to reduce the tediousness of the operation and make paint-mixing more attractive, the assistant superintendent of the Fifty-second Street "surface" repair shop conceived the idea of using the mechanism from a Boyer air drill to drive the paint-mixing paddles. This air drill is mounted in a strap-iron framework, and arranged to drive the rotating paddles through a pinion and gear. This is necessary in order to provide for the best operating speed of the air drill, and at the same time insure against too rapid stirring. The air-drill frame is constructed of strap-iron ¾ in. thick by 3 in. wide. The air drill pinion and gear are so mounted in this that the entire driving mechanism is self-contained. The base strap which fits to the top of the tank extends over the edges and is slotted to receive two latches. These latches consist of a threaded I-bolt and nut. The center of the gear is broached to fit the top of the driving shaft, and the entire driving mechanism can be readily lifted off and fitted to another tank as desired. An air connection



AIR DRILL DRIVING MECHANISM FOR PAINT MIXER



GROUP OF PAINT-MIXING TANKS



INTERIOR OF PAINT-MIXING TANKS

is provided convenient to the stand on which the paint mixers are located, and a short length of hose will reach any tank and provide for the operation of the air-driving mechanism. One air-driving mechanism thus serves for all of the tanks and the man in charge can perform other duties at the same time that the paint is being mixed.

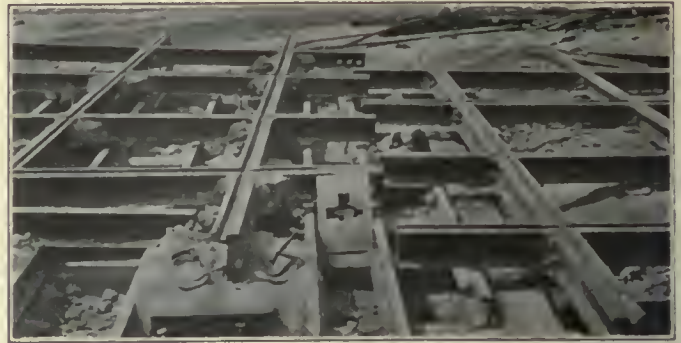
As evidence of the effectiveness of this mixer, it is possible to break up and prepare for use 265 lb. of white lead and color pigment together with 17 gal. of oil turpentine and japan after one hour's mixing.

Milwaukee Thermit-Welded Crossings Are Long-Lived

Crossings Are Welded in Company's Shops in Halves to Facilitate Handling and Reduce Number of Welds Required in Field

MARKED savings, both in lower first cost and longer life, have been effected by the Milwaukee Electric Railway & Light Company in reclaiming old and building up new crossings by means of thermit welding, as compared with installing new special work. This company, which was the pioneer railway to make Thermit welded crossings, has installed a considerable number of them in Milwaukee. A recent inspection showed that, after service tests extending in some cases for more than five years, these crossings are standing up in fine shape.

The Milwaukee method of making up a double-track square crossing without bolts or joints is shown in one of the accompanying illustrations. The two halves of the crossing were first separately built up at leisure at the railway shops in order to facilitate handling and reducing the number of welds to be made in the street. The half-crossings were constructed by building up each component cross by Thermit welding, thus requiring eight welds for each half-crossing. These halves were then transported to the job, thus leaving only four



DOUBLE TRACK SQUARE CROSSING MADE IN HALVES WITHOUT JOINTS

in a crossing over which double-track cars were operated at from a one-half to a three-minute headway. In April, 1917, this frog was removed from the crossing and installed in another crossing to replace a broken cast-steel frog which had been installed in 1915, the same date as the original installation of the Thermit frog.

The cost of building up double-track crossings by Thermit welding averages around \$30 to \$40 per frog, including cost of rail, labor and welding material, or about \$480 to \$640 for the complete crossing.

Measuring Boiler Draft Conditions

MUCH desirable information regarding the working of boilers can be obtained from an accurate knowledge of draft conditions. Thus a knowledge of the difference of pressure above and below the grate will aid in obtaining the best results from any particular class of fuel. Similarly, an increase in the pressure difference between the combustion chamber and the dampers will indicate that the boiler is becoming dirty. Draft measurements can of course be obtained by means of U-tubes connected to suitable points.

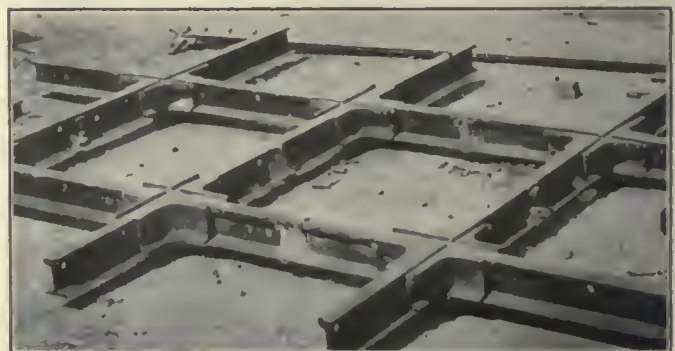


THERMIT FROG AFTER FOUR AND ONE-HALF YEARS SERVICE

remaining joints to be welded to complete the crossing, in addition to the sixteen welds which connected the crossing to the adjoining ordinary track.

Another illustration shows a series of chrome-nickel electric-steel frogs welded by the same company into a half-crossing. It will be noticed in this case that the rail arms of different unit frog pairs were welded together instead of the crosses themselves, so as to form a half-crossing from four units.

The third illustration shows another Thermit-welded frog in Milwaukee, where the 4½-year service test speaks for itself. The frog was installed in April, 1915,



CHROME-NICKEL ELECTRIC STEEL LAYOUT WELDED INTO HALVES

These readings, however, are often rendered unreliable as evaporation and condensation vary the quantity of water present in the tube.

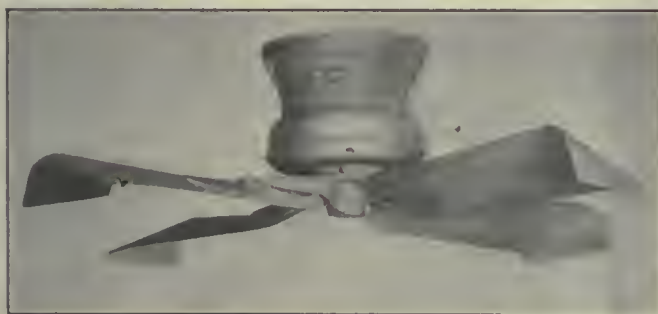
Among the newer draft indicators is one recently placed on the market by the Underfeed Stoker Company, Ltd., of Coventry House, South Place, London, England. This instrument gives accurate direct readings without the use of mechanism. The units are inclosed in a dust-tight case provided with a plate glass window. Each unit consists of a central glass tube connected at its upper end to the point at which it is desired to measure the pressure. The lower end of this tube

is open and dips into a large test-tube which is about half-filled with water and surrounds the central tube for the greater part of its length. To overcome the objection to a form of scale which will be affected by evaporation of the water and by condensation of the vapor, a floating scale in the form of a hydrometer tube is employed in the instrument. This scale, which is divided into inches and tenths with a central zero, is inclosed in a glass tube weighted so that it will float vertically in the water with the zero of the scale at the water level. This float tube rises and falls with the water in the tube so that the position of the surface of the water in the outer tube relatively to the floating scale is at all times a reasonably accurate measure of the pressure in the central tube. The float tube is kept central and prevented from adhering to the inner tube by a number of projections formed on the glass.

4000 Fans Ordered for Subway Cars

THE New York Municipal Railway Corporation recently placed an order for 4000 fans to be used in ventilating its subway cars, with the General Electric Company, Schenectady, N. Y. These fans are especially designed for railway service, which requires a particularly rugged construction to withstand shocks, jolts, and current surges resulting from gaps in the third-rail. The general outline and surfaces of the fan have to be smooth, also, in order to minimize the collection of dust and dirt and facilitate cleaning.

Each car is equipped with five single-coil fans connected in series across the line. The maximum line voltage specified is 750, the minimum 450, with an



SINGLE-COIL-TYPE 38-IN. CEILING FAN FOR N. Y. M. SUBWAY CARS

average of 575. Each fan is wound for 115 volts, and the watt-input is not to exceed 150. The speed of these fans is approximately 300 r.p.m. They will deliver air at a maximum velocity of 500 ft., measured 3 ft. below the center of the blade, and at a maximum of 300 ft. when measured 3 ft. from the floor of the car. This air velocity is required when operating under a normal voltage of 575.

The motor frame is designed for direct attachment to the car ceiling and, as already stated, crevices and external surfaces are eliminated to provide for convenient cleaning. A metal canopy completely incloses the top part of the motor, which contains the commutator brushes and brush rigging. All leads and connections inside the motor are securely anchored to prevent movement due to the vibration of the car, and all screws are provided with lock washers to prevent them from working loose. Both field and armature windings are made

with pre-treated cotton-covered enamel wire, thoroughly impregnated and baked with insulating varnish. Each motor has four steel poles and the field windings are series connected with the drum type armature. The commutators are slotted to a depth of 3-64 in.

The armature rotates on hardened steel thrust bearings completely immersed in oil, and the stationary shaft is lubricated by means of a spiral groove on the armature spider. A drilled hole in the spider casting provides for the return of oil to the main reservoir; consequently there is a continuous lubrication of the bearing. The motors can be readily oiled by removing the blade holder. All fans are finished in white enamel with nickel-plated trimmings to harmonize with the car interior.

Association News

American Executive Committee Approves Increase in Dues

A MEETING of the executive committee of the American Association was held at headquarters on Dec. 2 with First Vice-president Richard McCulloch in the chair, President J. H. Pardee being out of the country. Besides the chairman there were present C. Loomis Allen, W. I. Bartholomew, E. B. Burritt, J. K. Choate, W. H. Collins, Thomas Finigan, S. B. Hare, General George H. Harries, C. L. Henry, I. A. May, J. D. Mortimer, L. S. Storrs and T. S. Williams.

The principal business before the meeting was consideration of the proposed increase in dues. Plans for increasing the income of the association to meet the greatly augmented expenses had been prepared by a committee of which P. J. Kealy is chairman. After full discussion it was decided to submit to the mid-winter meeting a plan for a scale of dues for railway members, based on a minimum fee of \$50 with a maximum fee of \$2500 and a graduated scale between. For the year 1920, it is proposed that the dues be \$50 plus the factor 0.0002 multiplied by the gross income; and for the year 1921 and thereafter, \$50 plus the factor 0.00025 times the gross income. It is further proposed that payments be put on a quarterly or semi-annual basis if possible. Appended is a draft of the sections of the constitution as it is proposed to amend them to provide for the new scale.

The committee also discussed the matter of enlarged quarters for the association, but deferred action until the January meeting.

Secretary Burritt submitted a financial statement covering the association's fiscal year ended Oct. 31, 1919, which showed a gross income of \$115,411 and gross expenses of \$119,339, and this was approved.

The mid-winter dinner and meeting then came up for attention, and the program committee, through J. D. Mortimer, chairman, outlined the plan for the meeting. The meeting and dinner will be held at the Hotel Hollenden, Cleveland, D. B. Dean being chairman of the dinner committee. Local committees have already been appointed in Cleveland.

The question of the I. C. C. hearing on electric railway mail pay to be held on Dec. 6 was then discussed.

Among other items discussed, but without definite

action, were co-operation between the association and interurban railways in promoting express traffic, the publication of a directory of manufacturer members and their products together with a list of electric railway officials and a possible association employment exchange, Mr. Mortimer then gave a short summary of the brief prepared by the committee of 100 covering its testimony presented before the Federal Electric Railways Commission in the Washington hearings. This brief was prepared by Bentley W. Warren, counsel for the association during the hearings.

INCOME AND EXPENSE STATEMENT ONE YEAR ENDED OCT. 31, 1919

Revenues		
Admission fees:		
Railway companies.....	\$ 200.00	
Manufacturing companies.....	880.00	
		\$ 1,080.00
Annual dues:		
Railway companies.....	\$42,193.50	
Manufacturing companies.....	9,818.50	
Individuals.....	1,431.00	
		\$53,443.00
Miscellaneous income		
Interest on deposits.....	\$ 324.58	
Interest on investments.....	134.79	
Sale of year book and proceedings.....	162.53	
Sale of "Engineering Manual" and binder.....	81.30	
Sale of "Cost of Urban Transportation Service".....	35.00	
Sale of "Bibliography on Valuation".....	5.00	
Sale of miscellaneous pamphlets.....	208.68	
Sale of convention exhibit space.....	27,998.55	
Sale of dinner tickets.....	7,495.00	
		\$36,445.43
Aera:		
Advertising.....	\$15,630.39	
Subscriptions:		
Railway companies.....	3,494.00	
Manufacturing companies.....	1,569.00	
Individuals.....	954.00	
Company section members.....	2,579.96	
Paid subscriptions.....	170.27	
Sale of extra copies.....	40.85	
Sale of binders.....	4.25	
		\$ 24,442.72
		\$115,411.15
Expenses		
American Association:		
Salaries.....	\$20,371.71	
Rent.....	4,562.06	
Postage.....	3,157.97	
Office supplies and expenses.....	1,514.30	
Express.....	73.02	
Telephone and telegraph.....	3,050.83	
Stationery and printing.....	4,490.06	
Repairs to furniture and equipment.....	68.10	
Traveling expenses of secretary.....	1,134.35	
Traveling expenses of special engineer.....	106.62	
General expense.....	1,063.80	
Exchange.....	104.04	
1918 Conference.....	62.85	
Miscellaneous pamphlets.....	1,596.69	
Mid-Year meeting.....	630.54	
Mid-Year dinner.....	6,109.90	
"Engineering Manual" and binder.....	242.21	
Proceedings (Engineering Association).....	225.58	
General convention expense (1919).....	9,500.23	
Convention exhibit expense (1919).....	17,320.89	
Convention entertainment expense (1919).....	3,203.67	
Executive committee.....	422.23	
		\$88,911.55
Aera:		
Salaries.....	\$12,203.27	
Postage.....	165.03	
Rent.....	678.00	
Telephone and telegraph.....	367.49	
Miscellaneous.....	71.50	
Discount.....	190.22	
Traveling expenses of staff.....	1,903.00	
Magazine expense:		
Printing.....	8,973.98	
Paper.....	3,236.97	
Cartage.....	32.43	
Mailing.....	558.33	
Cuts.....	486.65	
Express.....	38.40	
Binding.....	60.00	
		\$25,974.33
Claims Association:		
Hooper Holmes Bureau.....	\$ 1,424.85	
Expenses of representative attending executive committee.....	14.00	
		\$ 1,438.85
Accountants' Association:		
Expenses of representative attending meeting of National Association of Railway and Utilities Commissioners.....	\$ 14.00	
		\$ 14.00
		\$ 119,338.73

PROPOSED REVISED FORM OF SECTION XIV—FEES

XIV. (a) Companies seeking company membership in the Association shall pay an admission fee of \$10.

(b) Railway company members shall, for the year beginning Nov. 1, 1919, pay in advance, annual dues in accordance, except as to minimum and maximum, with the amount of their gross earnings from electric railway operation, during the preceding fiscal year of the respective members as follows:

Companies having gross receipts of \$50,000 or less, shall pay fifty dollars (\$50) per annum; companies having gross receipts of more than fifty thousand dollars (\$50,000) shall pay fifty dollars (\$50) plus 0.0002 times their gross receipts per annum provided that no company shall be called upon to pay more than \$2,500.

For the fiscal year beginning Nov. 1, 1920, and thereafter railway member companies shall pay in advance annual dues in accordance, except as to minimum and maximum, with the amounts of their gross earnings from electric railway operation during the preceding fiscal year of the respective members as follows:

Companies having gross receipts of \$50,000 or less, shall pay fifty dollars (\$50) per annum; companies having gross receipts of more than fifty thousand dollars (\$50,000) shall pay fifty dollars (\$50) plus 0.00025 times their gross receipts, provided that no company shall be called upon to pay more than \$2,500.

Manufacturer member companies shall for the fiscal year beginning Nov. 1, 1919, pay in advance, annual dues in accordance, except as to minimum and maximum, with the amounts of their gross earnings derived from the business of manufacturing or selling material or furnishing services to electric railways during the preceding fiscal year of the respective members as follows:

Gross receipts:		Rate
Under	\$50,000	\$50
Between	50,000 and 100,000	70
Between	100,000 and 250,000	100
Between	250,000 and 500,000	150
Between	500,000 and 1,000,000	250
Between	1,000,000 and 2,000,000	450
Between	2,000,000 and 3,000,000	650
Between	3,000,000 and 4,000,000	850
Between	4,000,000 and 5,000,000	1,050
Between	5,000,000 and 6,000,000	1,250
Between	6,000,000 and 7,000,000	1,450
Between	7,000,000 and 8,000,000	1,650
Between	8,000,000 and 9,000,000	1,850
Between	9,000,000 and 10,000,000	2,050
Between	10,000,000 and 11,000,000	2,250
Between	11,000,000 and 12,000,000	2,450
Over	12,000,000	2,500

For the fiscal year beginning Nov. 1, 1920, and thereafter, Manufacturer member companies shall pay in advance, annual dues in accordance, except as to minimum and maximum, with the amounts of their gross earnings derived from the business of manufacturing or selling materials or furnishing service to electric railways during the preceding fiscal year of the respective members as follows:

Gross Receipts:		Rate
Under	\$50,000	\$50
Between	50,000 and 100,000	75
Between	100,000 and 250,000	110
Between	250,000 and 500,000	175
Between	500,000 and 1,000,000	300
Between	1,000,000 and 2,000,000	550
Between	2,000,000 and 3,000,000	800
Between	3,000,000 and 4,000,000	1,050
Between	4,000,000 and 5,000,000	1,300
Between	5,000,000 and 6,000,000	1,550
Between	6,000,000 and 7,000,000	1,800
Between	7,000,000 and 8,000,000	2,050
Between	8,000,000 and 9,000,000	2,300
Over	9,000,000	2,500

Bulletin News Page

Summary of the Principal Happenings of the Industry of Current Interest Since the Last Issue of This Paper Was Published

PRINTED DECEMBER 19, 1919

At the hearing before the Connecticut Public Utilities Commission on Dec. 8 and 9 on the zone fares charged by the Connecticut Company, the company produced evidence to show that during the first month of zone fares its revenue had increased \$128,000.

Dallas has recorded its first surplus under its new service-at-cost grant.

Abandonments of railway lines are announced from Idaho, Indiana and Louisiana.

Under the reorganization plan adopted by the Buffalo (N. Y.) Southern Railway the interest requirements have been cut from \$32,000 to \$6,000 a year.

The City Commission of Memphis, Tenn., has ordered the Memphis Street Railway to abandon the skip stop. The company has secured a temporary injunction restraining the city authorities from enforcing the order.

The Railroad Commission of California has confirmed the proposed changes in the plan for the reorganization of the Oakland & Antioch Railway. The attitude of investors toward electric railway securities made the change imperative.

The City Council of Oswego, N. Y., has authorized the Empire State Railroad to charge 7-cent fares in that city.

The Second Avenue Railroad, New York, has been unable even to pay the interest on its receiver's certificates. The holders of these securities are therefore asking for a receiver for the receiver.

The sale of the property of the ill-fated Southern Traction Company of Illinois under foreclosure has at last been confirmed.

The Cummins railroad bill laying down a general policy for the government with respect to the railroads will be rewritten. Electric railways are not included in the provisions of the measure.

Engineers reporting to security holders of the Chicago (Ill.) Elevated Railways see little hope for the company in the immediate future despite the present 8-cent fare.

The California Railroad Commission has denied the application of the Pacific Electric Railway for an increase in the rate for transporting petroleum and its products.

A municipal ownership referendum petition is being circulated in St. Louis, Mo.

The street railway commissioner of Youngstown, Ohio, has recommended the purchase of twenty-five one-man cars.

The suburban lines of the Detroit (Mich.) United Railway were damaged to the extent of \$250,000 in the recent severe storms in the Central West.

The Boston (Mass.) Elevated Railway has established a 5-cent fare on its line in Charlestown, Mass.

Pittsburgh's Mayor advocates that the present transit commissioner be displaced by a board of three with broader powers and jurisdiction.

The city of Ashtabula, Ohio, has purchased the local electric railway. The line will be operated under the direction of M. H. Turner, city manager.

The Columbus Railway, Power & Light Company, Columbus, Ohio, is preparing to ask for a 6-cent fare, according to a statement made on Dec. 12 by L. D. Hutchins, chairman of the board which is arbitrating differences between the company and its employees.

The Supreme Court of Massachusetts on Dec. 12 handed down two decisions in which municipal and state authorities were supported in their right to regulate jitney operation.

The Council of Detroit, Mich., has sustained Mayor Couzens in his veto of the procedure advocated by the local Street Railway Commission for the settlement of the local railway situation.

The Massachusetts anti-strike bill has been defeated. The committee on legal affairs of the House recommended such action. President Mahon of the Amalgamated Association opposed the measure.

The Minneapolis service-at-cost grant was defeated at the election on Dec. 9. There is much difference of opinion in regard to the reasons for the failure of the legislation.

The Canadian border towns opposite Detroit, Mich., have voted in favor of taking over the lines of the Detroit United System operated there.

The conference of Mayors, called by Mayor Couzens of Detroit, Mich., to be held at Toledo for the purpose of talking over the issues involved between the cities and the railway companies has been postponed.

Seven-cent fares went into effect on Dec. 1 on the lines of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo. The fare was formerly 5 cents. At the same time the trainmen received an increase in wages of 8 cents an hour.

A plan has been drawn up at conferences of the Public Service Commissioner of Greater New York, the Transit Construction Commissioner and representatives of the railways for eventual municipalization of the roads. The next step is to have the directors of the companies pass on the proposal. After that it is expected a formal proposal will be made to the city.

Stone & Webster report that even with an 8-cent fare there will be no surplus for the Interborough Rapid Transit Company, New York, before 1922.

The Pittsburgh valuation hearings have been closed by the Public Service Commission.

Another dividend has been passed. This time it is the Public Service Corporation of New Jersey. The payment is the one ordinarily made on Jan. 1 on the common stock of the company. President McCarter puts the losses of the company under the zone system at \$1,500,000.

Two million dollars is the amount at issue between the city and the company in the valuation proceeding involving the system of the Houston (Tex.) Electric Company.

The return allowed to the stockholders of the Cleveland (Ohio) Railway under the service-at-cost grant there has been advanced by arbitration from 6 per cent to 7 per cent.

The Public Service Railway of New Jersey began charging 7-cent fares on Dec. 7 under authority of the New Jersey Board of Public Utility Commissioners. One cent is charged for a transfer.

John Bauer, formerly chief of the bureau of accounts of the Public Service Commission, First District, has been appointed expert adviser on transit matters in the office of the corporation counsel of New York City.

The Cleveland (Ohio) Railways on Dec. 15 reduced its ticket rate from 11 tickets for 50 cents to six tickets for 25 cents. The cash fare remains at 5 cents.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

Municipalization Suggested

New York Companies Expected to Make Proposal to City Along Lines of Commission Suggestion

As a result of conferences held by Public Service Commissioner Lewis Nixon of New York City and Transit Construction Commissioner John H. Delaney with representatives of the local railways a plan has been drawn up for the settlement of some of the problems confronting the company. Included in it is a proposal to transfer title to the roads to the city. The matter now will go before the directors of the companies for consideration.

TRANSFER OF TITLE TO CITY

In the proposal are contained many of the suggestions advanced publicly on previous occasions by Mr. Nixon. In substance the plan entails:

Transfer to the city of all titles held by the companies in railroad properties.

Guaranteed payment by the city of a reasonable rate of interest on fair appraisals.

Setting aside of 1 per cent for the purchase of the properties at the expiration of the thirty-eight years.

A sufficient increase in fares to meet these requirements.

All else connected with the plan are matters of detail, which it was agreed could be worked out if the companies agreed to relinquish control of their properties.

Mr. Delaney said there had been several conferences with representatives of the transit companies, and that Commissioner Nixon had been present at most of them. Mr. Delaney wanted it expressly understood that no proposal had been made by the companies, that what the city thought was the solution of the traction problem was set forth, and that if the concessions suggested were presented to the Board of Estimate they would have to be presented by the companies themselves.

WAY OPEN TO CITY

Mr. Delaney explained that Article X of the dual system contract under which the city rapid transit lines are now operated points the way the city may travel in acquiring complete municipal ownership of all the rapid transit lines without overlapping the debt-incurring capacity of the city, and without violating restrictions placed upon the city in this respect by the State Constitution. He explained that this article permitted the Interborough Rapid Transit Company to obtain possession of the partly completed Steinway tunnel and to assign it immediately to the city.

Mr. Delaney said:

This principle could be applied to the acquisition by the city of the elevated railroads or any other transit property and complete municipal ownership be obtained on a basis which might be character-

ized as on credit terms, and full payment be spread over the period of amortization. Any contracts made on this basis should also secure to the city the privilege of taking possession at any time it saw fit by payment of the full purchase price agreed upon.

Concerning the surface lines Mr. Delaney said:

Representatives of these lines are asking the city to permit them to change an 8, 9 or 10-cent fare in order that owners of some of these lines may continue receiving as high as 18 per cent dividends. Large amounts of money have been spent in improving these lines which will revert to the owners if these excessive payments are not continued. The lines are hiding behind holding companies, and are enmeshed in a tangle of red tape. There is no doubt that the time has come when all of the wrongs committed against the interests of the people should be corrected.

Sounded previously on the general traction situation and the prospect of overtures being made for the settlement of the present difficulty, Mayor Hylan was quoted as follows:

Any proposition the transit interests may have to make to the city should be submitted to the Board of Estimate. They will find that the board is ready and willing to listen to them. Any matter of that sort will, of course, receive the most careful consideration.

Conference of Mayors Postponed

The conference on electric railway matters suggested by Mayor James Couzens of Detroit to be held in Toledo on Dec. 8 was postponed because of the fuel crisis. The Mayors of a number of cities where electric railway matters are up for settlement were invited to attend. It is hoped a joint policy of procedure may be mapped out. Among the Mayors expected to be present were Mayor Couzens of Detroit, Mayor Schreiber of Toledo, Mayor Thompson of Chicago, Mayor Hoan of Milwaukee, Mayor Babcock of Pittsburgh, and a representative of Mayor Davis of Cleveland.

Henry L. Doherty, operating head of the Toledo Railways & Light Company, which took its cars off the streets of Toledo about a month ago, signified his intention to attend the conference and discuss the railway situation in general and Toledo's problems in particular.

Mayor Couzens has been giving much thought to the railway difficulties in Detroit, Cleveland and other cities recently and believes he will be able to unfold a plan of considerable magnitude. It is expected that Mayor Thompson of Chicago will make public at the conference, his so-called "People's Plan." In the opinion of Mayor Couzens the electric railways through the federal commission, have attempted to crystallize and nationalize their side of the question and he believes the municipalities should make an effort to unify the people's side.

Transit Plans Outlined

Mr. Van Sweringen Shows Highly Developed Scheme for Handling Cleveland's Future Traffic

As a witness before the board of arbitration, hearing the request of the Cleveland (Ohio) Railway for an increase in dividends to stockholders from 6 to 7 per cent, O. P. Van Sweringen, of the Cleveland Union Terminals Company and the Cleveland & Youngstown Railway, gave considerable information in regard to the rapid transit plans, as developed by himself and associates.

Basing his statements on the belief that the population of Greater Cleveland will increase from 1,000,000 to 1,500,000 in ten years, he said the city's growth would require an addition of from 30,000 to 35,000 acres of land, 70 miles of rapid transit track construction and the expenditure of about \$50,000,000 for the work.

He said rapid transit was the only real solution of the city's transportation problem. The city's proposal to build a subway was not so much a matter of transportation as it was for the relief of the surface highway. Cleveland had reached a point where people must be carried from the residence districts to the center of the city by subway.

SUBWAY COSTS ESTIMATED

The cost of subways to meet Greater less time than is now taken by the Cleveland's rapid transit needs, he said, would be between \$2,000,000 and \$3,000,000 per mile, while the cost of elevated railways would be about \$1,250,000 per mile.

The private right-of-way plan, adopted by the Cleveland & Youngstown road, was the most economical means of furnishing rapid transit facilities.

Mr. Van Sweringen said that interests with which he is connected do not expect to develop the entire transportation system for Greater Cleveland, but are willing to co-ordinate their interests with the Cleveland Railway or any other company, or the city, in case a subway is built. He further pointed out that certain sections of the city may be served by tracks on the rights-of-way of various steam roads which radiate almost from a common center in the city.

He declared, however, that the proposed new union station would receive attention first. That matter is in hand now. It will be developed as laid out in the franchise which the people have granted. Preliminary construction work will be commenced early in 1920.

Minneapolis Grant Fails

Voters Reject Cost-of-Service Plan by Large Majority—Five-Cent Fare Will Continue.

The voters of Minneapolis, Minn., at the special election on Dec. 9, defeated the cost-of-service franchise proposed for the Minneapolis Street Railway, subsidiary of the Twin City Rapid Transit Company. The majority against the franchise was 7,572. The total number of votes cast was only 3000 less than the number cast in the last mayoralty election. The vote in favor of the franchise was 22,977, while that against it was 30,549.

PRESENT FARE TO CONTINUE

Defeat of the franchise means that the company must content itself, for the present at least, with a 5-cent fare. Under the proposed plan the company would have been guaranteed a return of 7 per cent, and the fare would have been adjusted accordingly. The fare was to have remained at 5 cents for a three-months period, after which it was to have been advanced, if necessary.

An analysis of the company's records recently made by Marwick, Mitchell, Peat & Company, certified public accountants, indicated that under the cost-of-service plan the average fare for the first ten months of 1919 would have been 5.30 cents and for the month of October 5.22 cents. The company was prepared if the plan had been approved, to install a 6-cent cash fare with a ticket rate of 5.4 cents.

The election marked the culmination of efforts on the part of Mayor Meyers and the Socialist party to defeat the franchise. The Mayor opposed the plan from the start, contending that, while he favored the cost-of-service principle, the valuation of \$24,000,000 fixed for the company's property was too high. This valuation was lower, however, than the appraisal of the city engineer. Since he lacked power to veto the franchise ordinance, which was passed by the City Council early in September, Mayor Meyers applied to the District Court of Hennepin County for an injunction to prevent its submission to the voters. The application was denied, the court's decision being affirmed on Nov. 21 by the Minnesota Supreme Court.

CAMPAIGN WAS SPIRITED

An active campaign was carried on both for and against the measure. The company issued numerous statements in its magazine, the *Rapid Transit News*, in which it explained its position and analyzed the proposed franchise. Several municipal organizations, notably the People's Franchise Bureau and the Car Riders' League, also advocated the measure, while the Anti-Franchise League opposed it.

The opponents of the measure centered their attack on the section of the franchise which provided that the city might purchase the railway property at the end of any five-year period.

They contended that too much power would thus be placed in the hands of the City Council, and that under the franchise a group of fourteen Aldermen could combine to buy the property for the city at any time without referring the matter to the people.

The Socialists formed the only solid element against the franchise. In a general way the vote followed the usual political lines, the strong Republican districts giving majorities for the franchise and those of Socialist sentiments going heavily against it. The third ward, which is suffering for want of new car lines, gave good majorities for the franchise in the upper precincts, but these were overcome by the adverse vote in the river districts.

Commenting upon the result of the election the *Minneapolis Journal*, which supported the franchise, said editorially:

The great mistake of the campaign just ended was that it was not longer in opening and longer in closing. There was not time for the people to study the issues carefully and make up their minds with cool consideration. Too many postponed study of the franchise until a few days ago, and then found themselves bewildered in the final storm of charge and counter-charge. When the people vote again on franchise or charter they should have from three to six months in which to familiarize themselves with all the details.

Municipalization Authorized

As a result of the special election held on Dec. 6 in Windsor and eight other border towns, the Sandwich, Windsor & Amherstburg Railway, a branch of the Detroit United Railway that serves these border municipalities, will be taken over by the Ontario Hydro-Electric Power Commission.

Six of the nine municipalities concerned voted for the plan with sweeping majorities, while one only, the town of Anderdon, refused to support the proposed by-law providing for the purchase of the railway.

As the financial obligation to be assumed by each municipality was worked out proportional to its population, Anderdon's portion was less than 10 per cent of the total. This town's failure to ratify the by-law will not interfere with the purchase plan. The other municipalities concerned will assume Anderdon's financial obligation, the greater part to be borne by the city of Windsor. In Windsor the ratepayers' votes cast were practically forty to one in favor of municipal ownership.

Sir Adam Beck, chairman of the Ontario Hydro-Electric Power Commission, arranged matters with the Detroit United Railway officials, the purchase price agreed upon being \$2,100,000. This is exclusive of the power plant which furnishes electric light and power to the residents of Windsor and Walkerville in competition with the service of the Hydro-Electric Commission. Arrangements are being made in the Windsor Council providing for a vote on the proposed plan of taking over the power plant by that city at a cost of about \$190,000.

Detroit's Mayor Sustained

His Veto of Railway Commission's Recommendations Upheld by the City Council

Mayor Couzens of Detroit, Mich., exercised his power to veto, and thereby defeated the action of the majority of the City Council by which they went on record at a previous meeting in favor of adopting the report of the Street Railway Commission. The Council favored authorizing the Board of Street Railway Commissioners to present a plan of settlement to the Council after negotiating with the Detroit United Railway with regard to extensions, and a plan of operating the system similar to the Tayler plan as it is now in force in Cleveland.

PROTECT THE PEOPLE

As a two thirds majority was necessary to pass the resolution over the chief executive's veto, the attempt failed, five members voting for and four voting against the resolution.

In his veto message, the Mayor summarized his reasons for not favoring the rides-at-cost plan. He said in part:

As a responsible agent of the people I feel it my duty before presenting any proposition to them to analyze its every detail. I have conscientiously tried to ascertain how the recommendations of the Board of Street Railway Commissioners would meet with the people's wishes, as indicated in their various votes upon railway settlement, and fail to find where they agree in any instance.

The results of six votes of the Detroit electorate on various railway propositions, since November, 1906, were reviewed. In summarizing the Mayor stated that three of these agreements involved franchises; two were agreements providing for the purchase of the lines and both of these received a greater affirmative vote than the three proposals for franchises.

The message further stated that the Mayor believed it futile to submit another plan to the voters. If an affirmative advisory vote indicates that the public wants a Tayler plan franchise, it is proposed by the Mayor to negotiate while construction work is being carried on.

In reviewing conditions in Cleveland, the claim was made that the much needed extensions have not been obtained under the Tayler plan, and it was pointed out that the matter of extensions is paramount in Detroit.

\$15,000,000 FOR CONSTRUCTION

Two propositions are now before the Council. One is the proposed ordinance providing for an issue of public utility bonds to the amount of \$15,000,000 for the piece-meal construction and the operation of a railway system. The other proposition calls for an advisory vote on the revised Tayler plan.

The old railway commission having resigned, the Mayor is without a commission. In regard to the appointment of a new commission, the Mayor says that such a commission will probably be named when the Council has determined upon a plan that will require the services of a commission.

Anti-Strike Bill Killed

Massachusetts Measure Is Lost—Cambridge Subway Purchase Measure Passed—Jitney Regulation

Notable among the electric railway measures discussed before the present special session of the Massachusetts Legislature are bills concerning the relation of the electric railway employee to his employer and a measure which affects the affairs of the Boston Elevated Railway.

LABOR OPPOSED BILL

The former bill was termed the anti-strike bill. It has been called revolutionary. Briefly the plan provided for continuity of service for lines under public control, the abolishment of strikes, and the arbitration of disputes. The terms of the proposed act were published in the *Electric Railway Journal* for Nov. 8, page 873.

W. D. Mahon, international president of the Amalgamated Association, and James H. Vahey, counsel, appeared in opposition to the bill. Quoting from President Wilson's speech of Dec. 2 "that the right of individuals to strike is inviolate and ought not to be interfered with by any process of government," Mr. Mahon intimated further that "there is no need of this legislation, because the street car men are filled with the American spirit, recognizing their duty and will not strike."

In rendering an opinion concerning the legality of this bill, the committee on legal affairs of the House concluded that it would be wise and expedient at this time to reject this measure and accordingly the anti-strike bill has been withdrawn.

It is worthy of special attention that the discussion of the so called anti-strike bill brought out little support on the part of the railways.

Of special interest to the city of Boston, as it concerns the welfare of the Boston Elevated Railway, is the bill providing for the purchase of the Cambridge subway. After the rejection of the Cambridge subway rental bill, which provided for the assumption of the subway rental by the communities served by the Boston Elevated Railway, a rental amounting to \$1,500,000 per annum, a bill providing for the purchase of the Cambridge subway was introduced and after special endorsement by Governor Coolidge was passed 114 to 34 by the House to be engrossed.

DOUBLE BENEFIT SECURED

The bill provides for the purchase of the subway from the Boston Elevated Railway at a cost not to exceed \$8,000,000, the subway then to be rented to the elevated railway at a rate equivalent to 4½ per cent on the bonds to be issued by the State on account of the purchase of the property. The \$8,000,000 received by the Boston Elevated Railway is to be used for the purchase of rolling stock and other equipment, which otherwise could not be obtained. The Boston Elevated Railway, on the other hand, benefits by the

difference between the interest of 4½ per cent it will pay as rental and the relative high rate which it would be obliged to pay on bonds and stocks issued for new capital, necessary for maintenance and future development.

The committee on ways and means of the Massachusetts Legislature has reported favorably on a bill to regulate the operation of jitneys within the State and also similarly on a bill which provides for special permission for street railways to initiate fare changes, subject to approval by the Department of Public Utilities. Such a bill if passed will be of great benefit since delay in obtaining official sanction of fare schedule changes has in the past imposed considerable losses on the railways.

\$621,715 in Improvements Authorized

Special Master Henry Lamm has authorized Rolla Wells, receiver of the United Railways, St. Louis, Mo., to expend \$621,715 during 1920 for the purchase of materials and the reconstruction of tracks. At the same time he allowed the receiver to pay a total of \$750,715 interest due on bonds on Jan. 1 and on Feb. 1. He also authorized Mr. Wells to buy 10 acres of land at Natural Bridge Road and the Kirkwood-Ferguson line at a cost of \$35,000 for the purpose of constructing loops on both Kirkwood-Ferguson and Natural Bridge lines, construct a fire escape at the company's offices at a cost not exceeding \$1,095, and construct a double-truck snow shovel.

Recommends Transit Commission of Three

Mayor E. V. Babcock, in presenting the annual budget estimates to the City Council of Pittsburgh, Pa., on Dec. 8, urged that Council create a transit commission of three members to handle all city activities relating to transportation companies. To give the matter added force, the Mayor made it a special recommendation. The city of Pittsburgh now has a transit commissioner, but the Mayor recommended that he be displaced by a board of three with broader powers and jurisdiction.

In the budget estimates, an appropriation of \$22,200 was suggested for the commission. Of this amount, \$10,000 is proposed for an advisory service in connection with the subway which the people of Pittsburgh, at a bond election, authorized. If the Mayor has his way, the commission would be empowered to consider the future needs of the city, as well as present problems.

Mayor Babcock has in mind as one of the commissioners Attorney Charles K. Robinson, special counsel for the city in the traction litigations now pending. Engineers would probably compose the rest of the board.

E. K. Morse, the present transit commissioner whose position would be displaced by the board of three, recently issued his annual report. He attacked the proposed subway, which is an administration measure.

Railroad Bill to Be Rewritten

Amendments Desired by Electric Railways Understood to Have Been Accepted

Interest in the Cummins bill is being dulled somewhat by the knowledge that the measure is to be practically rewritten in conference. The Esch Bill—the railroad measure which already has passed the House—was put through in half-baked form with the frank admission that the bill would not be recognizable when it emerged from conference.

While the Senate is making a conscientious effort to perfect the Cummins measure, it is a matter of common knowledge that many of the provisions, adopted after solemn and lengthy debate, must be sacrificed to meet the ideas of the House of Representatives. Every effort is being made at this writing to procure a vote on the bill on Dec. 20.

Section 10 of the Cummins bill provides for the consolidation of the railway properties of the United States into not less than twenty nor more than thirty-five systems. This provision has been vigorously assailed, but in all probability will stay in the bill. That section of the bill contains a proviso excluding electric railways from the scheme. Originally the proviso read "that street railways and interurban railways whose chief business is the transportation of passengers" shall be excluded. The wording was changed, however, and the following inserted: "That street, suburban, and interurban electric railways which are not operated as a part or parts of a general steam railroad system of transportation" shall not be included in the organization of railway properties which is proposed.

Winnipeg Men Accept Wage Award

The employees of the Winnipeg (Man.) Electric Railway have decided to accept the award of the Mather's commission on the demand made by the men for an increased wage scale.

The schedule submitted to the conciliation board on behalf of the union was 60 cents an hour for the first six months; 65 cents an hour for the second six months, and 70 cents an hour for the second year and thereafter.

The award, which the men have accepted, gives 46 cents an hour for the first six months; 49 cents for the second six months; 52 cents for the third year and thereafter. It also provides for an eight-hour day, instead of nine hours as heretofore. The nine-hour rate was 39 cents, 41 cents, 44 cents, and 47 cents, respectively.

Would Municipalize Guelph Road

The Ontario Hydro-electric Commission has made an offer in writing to the City Council of Guelph for the purchase of the Guelph Radial Railway at \$150,000 as on July 1, 1920, the road to be handed over free of all encumbrances. The offer is to be considered at a special meeting of the Council.

News Notes

Library for Its Employees.—It is announced that the Monongahela Valley Traction Company, Fairmount, W. Va., will purchase a library for the use of employees who want to become proficient in the fine points of the relations of an electric railway to its public.

Mayor to Push Subway Plan.—The present Mayor of Cleveland, Ohio, has recently been re-elected. He has announced his proposed subway plan as the most important construction work of the coming two years of his administration. The city will probably be asked to approve bonds for this work at a special election early next year.

City Purchases Railway.—The City Council of Ashtabula, Ohio, passed an ordinance on Dec. 8 to purchase the property of the Ashtabula Rapid Transit Company. The purchase price is \$296,000. There will be a bond issue for \$350,000 secured by a first mortgage with interest at 6 per cent. The operation of the road will be under the direction of M. H. Turner, city manager.

Buses for Broadway?—Directors of the Broadway Association at their regular meeting on Dec. 15 appointed a transportation committee and voted in favor of the use of motor buses as the best solution of the transportation problem on Broadway, New York. The committee will make a report "concerning the street surface transportation on Broadway with a view of submitting the information to the entire membership of the association for a referendum vote and later to submit the question to the entire business population of Broadway."

Cincinnati Linemen's Strike Quickly Adjusted.—A brief strike of the linemen of the Cincinnati (Ohio) Traction Company, which went into effect on Oct. 18 after several days of unsuccessful negotiations between union representatives and company officials, was settled satisfactorily in two days' time. A 35 per cent increase was asked over the old wage agreement which was made just prior to the War Labor Board's award in 1918 and expired on Nov. 15, 1919. The men were granted a 20 per cent increase, which places them on practically the same basis as the men in other departments.

Wants City to Take Line.—The City Council of Seattle, Wash., has been asked by residents of the Greenwood Avenue district to buy the Greenwood Avenue line owned by the Western Washington Power Company, or to provide a good service arrangement under the 5-cent fare. Thomas F. Murphine, superintendent of the Seattle Municipal Railway, recently discontinued the

transfer arrangement between the Ballard North line and the Green Avenue line, asserting that the service was too irregular and that the city was getting the long end of the haul on a 50-50 basis. Since that time residents of the district have been forced to pay a 10-cent fare.

Municipal Ownership Petition Circulated.—Initiative petitions for a new railway municipal ownership ordinance are being circulated by members of the Citizens' Referendum League of St. Louis. The ordinance provides for the purchase or lease of the railways by the city and their operation without charge to passengers. A "competent person" with at least five years' experience must be appointed by the director of public utilities to manage the system. Employees are to be in the classified service. The cost of operation is to be met by general taxation.

I. C. C. Recommendations Repeated.—The annual report of the Interstate Commerce Commission was made public on Dec. 4 by Clyde Aitchison, chairman of the body. As many of the functions of the commission were curtailed by the Federal control of railroads during the last year, the report repeats mainly the recommendations of other years. These recommendations are that the power to award reparation for unreasonable or unlawful charges be vested entirely in the courts; that the powers of the commission be extended to holding corporations as well as those which actually operate interstate transportation lines and that railroad operating rules be standardized.

Changes in Power Contract Too Drastic.—At a hearing before the Public Service Commission of Missouri on the application of the Union Electric Light & Power Company to increase its rates of selling current to the United Railways, St. Louis, Mo., T. E. Francis, attorney for the railway, said his company also would ask for a modification of the contract. The power company is asking for an increase of \$178,750 a year. A recommendation by Byllesby & Company, Chicago, engineers employed by both companies, was offered in evidence. They suggest an increase of \$130,000. Mr. Francis said the railway would ask to have modified that provision of the contract which compels the railway to pay heavy penalties for overloading in peak hours.

City Commission Recommends One-Man Cars.—Street Railway Commissioner William L. Sause of Youngstown, Ohio, has recommended in a letter addressed to the City Council the purchase of twenty-five one-man safety cars to be used on the local lines. In addition to this Mr. Sause recommends that a fund be raised to rebuild lines and other equipment which come under the direction of the city under the new service-at-cost system. Mr. Sause thinks it very essential that the new cars should not replace the present larger cars in the ratio of one to one, but that one or more lines should be fully equipped, on which safety cars

should be installed in the ratio of about three new cars to two of the old.

Washington Company Announces Labor Policy.—Quoting from a decision of the War Labor Board in support of its position, the Washington Railway & Electric Company, Washington, D. C., has refused to deal exclusively with the Amalgamated Association or any other organization of which its employees are members. There will be no discrimination against any employee because of his membership in any labor organization, President William F. Ham of the company told a committee of the Amalgamated Association. This means the Brotherhood of Employees, of which a number of employees of the company are members, and other labor organizations that may come into existence through the action of the employees, is guaranteed an "open-door" policy in dealing with the company.

Franchise Changes Requested at Cincinnati.—A request has been made of the City Council of Cincinnati, Ohio, to repeal the franchises granted the Interurban Railway & Terminal Company by the former villages of Kennedy Heights and Pleasant Ridge and pass an ordinance granting the Cincinnati Traction Company the right to use the track. This would give the company the right to operate its North Norwood cars over the track without delay. The plan has been agreed upon between C. W. Culkins, Street Railway Commissioner, and the officials of the railways. The new franchise would give the Cincinnati Traction Company the right to operate more than 700 ft. of track on Montgomery Pike, between Kennedy Avenue, and the present terminus of the interurban line, so that the city service may be extended from Kennedy Avenue, if it becomes necessary to do so at some future time.

\$250,000 Storm Damage at Detroit.—By far the worst storm ever encountered by the Detroit (Mich.) United Lines, with attendant destruction of property and suspension of service, was that of the hurricane on the afternoon and evening of Nov. 29. Never before was the territorial area affected so extensive as this time. The financial loss to the company is roundly estimated at \$250,000. Within the city of Detroit the Detroit United Railway's lines escaped much serious damage. Service suspensions, while numerous, were not of long duration and were largely due to falling trees and limbs. The situation in respect to the interurban lines was decidedly worse. Out in the country the wind had full sweep and in addition to the damage and delays through the company's own overhead system collapsing in spots the condition was made much worse by poles of other utilities, heavily laden with wires, falling across the tracks of the company and breaking through its overhead system. The storm struck the Rapid Railway a terrific blow. This division was paralyzed for five days with the exception of service between Detroit and New Baltimore.

Financial and Corporate

Engineers Report on "L"

Even With Eight-Cent Fare More People Must Use Chicago Lines to Make Them Successful

The preliminary report has been made by the engineers who were retained by the protective committee representing the holders of the notes of the Chicago (Ill) Elevated Railways and instructed by the committee to make an independent investigation of the operating and physical condition of the system. In spite of the increased revenue derived from the 8-cent fare, the engineers recommend that no part of the increased earnings be used for payment of the 6 per cent interest on the \$14,000,000 of notes. Principal and interest on these notes was due on July 1. The notes are secured by collateral and the holders face the alternative of waiting an indefinite time for payment of the principal and interest or of taking action to sell the collateral. The engineers say in part:

We have made no audit of the company's books, nor have we attempted to analyze its accounts. The results of operation for the system from January to September, 1919, inclusive, and estimates for October, November and December, prepared by the company, are herewith presented. The estimates appear to us to be reasonable.

The table shows that the four companies will earn, over bond interest, etc., of underlying companies, about \$500,000 for the year 1919. No allowance, however, has been made for accrued depreciation and nothing has been provided for interest on Chicago Elevated Railway notes.

While on the basis of present earnings, with 8-cent fares on the elevated and 7-cent fares on the surface lines, and with the present wage scale, it would seem probable that for 1920 the balance after paying bond interest, etc., of the underlying companies, would be about \$1,500,000.

This balance is not applicable for interest on Chicago Elevated Railway notes for the following reasons:

It is our understanding that for a number of years the company has taken care of its current maintenance charges out of operating expenses. It also charged certain large renewals to the rehabilitation account, then a part of surplus account. The company has now closed its rehabilitation account, and all renewals are charged direct to operation. An adequate maintenance charge for this year would be about \$2,500,000, which, we understand, is about \$500,000 more than will be expended.

While the \$2,500,000 would probably take care of current maintenance and normal rehabilitation, it would not provide any funds for a replacement reserve. We believe such an account should be built up and that with a company of this size it should not be less than \$1,500,000, from which large replacements should be made and the fund kept practically constant.

INTEREST MUST BE DEFERRED

It would seem, therefore, from the above, that it would be impossible to attempt to pay the 6 per cent on the \$14,000,000 notes at present. Even with the retention of the 8-cent fare the operating companies must look for increased riding on present facilities and must practice the greatest economies in operation to enable them in the near future to resume interest payment on the Chicago Elevated Railway notes.

The property as a whole is in first-class operating condition. The track and elevated structures were found to be mechanically sound. The cars and equipment, most of which are old, have been well cared for. The car repair shops, while of adequate capacity, are not equipped with modern machines.

The capacity of the loop is the limiting factor in the peak service. Our brief study would indicate that perhaps 20 per cent more people might be carried than at present by running additional cars on some of the trains and by lengthening some of the platforms. The growth of industry is now taking place outside, rather than inside the loop, which will help the company's earnings and will entail little, if any, increase in operating expenses and will call for practically no additional capital expenditures.

When the capacity of the loop is reached, drastic measures for handling the rapid transit traffic will have to be resorted to, and the shaping of plans for them can be undertaken none too soon. This company should take an active part in these negotiations, in order to protect its present large investment. While some of the lines have severe curves, where the possibility of derailment of cars, with serious results, always exists, still the company has had a fortunate experience in the matter of accidents.

The noteholders' protective committee is headed by Charles E. Mitchell of the National City Bank of New York. The Chicago members are R. Floyd Clinch of Crerar, Clinch & Company and George M. Reynolds, president of the Continental & Commercial National Bank. It is said that the committee will await the final report of the engineers and possibly the outcome of the pending litigation on fares between the Chicago Surface Lines and the city before recommending definite action to be taken by the noteholders.

City Wants Service But No Responsibility

The city of Merrill, Wis., has petitioned the Railroad Commission for an order to prevent the Wisconsin Valley Electric Company from discontinuing the operation of its railway property in that city. Operation is now being continued under a thirty-year franchise granted in 1889. This franchise expires on Dec. 31. Early in the present year the company notified the city that it would not ask for a renewal of the franchise at its expiration. In fact, it offered to sell its entire railroad property to the city.

The company operates a number of utilities in the Wisconsin River Valley, including a railway in Wausau, and maintains several hydroelectric generating stations. Merrill is a city of about 10,000 population. The company says that the railway there does not produce sufficient revenue to pay operating expenses and cannot be made to do so at any reasonable rate of fare. The present fare is 7 cents.

The city of Merrill is asking that the company be compelled to continue operation on the grounds that the franchise does not expire on Dec. 31; that the thirty-year limitation applied only to the exclusive feature of the franchise; and that the company should not be allowed to discontinue service on a part of the utility when the property as a whole is a profitable one.

Interborough in Dire Straits

Even With Eight-Cent Fare No Surplus Possible in New York Before 1922, Experts Say

Federal Judge Mayer on Dec. 16 gave out the report of Stone & Webster, the engineers, on the financial and physical status of the Interborough Rapid Transit Company and the New York Railways. It is pointed out in the report that the subway and elevated lines of the system will fail to earn their fixed charges during the fiscal year ending June 30, 1920, by \$8,778,000, as against a surplus in 1917 of \$8,885,359.

MORE THAN \$500,000,000 OF SECURITIES OUTSTANDING

It is pointed out that the securities outstanding in the hands of the public amounts to \$500,448,881 and 932,626 shares of no par value. The report says in part:

We have completed our examination of the properties of Interborough Rapid Transit Company, including the surface lines in the Borough of Queens, stocks and obligations which it owns, and also our examinations of the properties of New York Railways. Of the stock of Interborough Rapid Transit 97 per cent, and of the stock of New York Railways 86 per cent, is owned by Interborough Consolidated Corporation, of which James R. Sheffield is trustee in the bankruptcy proceedings pending before you. The properties of New York Railways are in the custody of Job E. Hedges as your receiver.

In the preparation of this summary we have followed in general the lines of the summary of our reports on the properties of the Brooklyn Rapid Transit System in order that the two summaries may be the more readily compared, and, taken together, give a picture of the condition of all of the properties directly in the custody of the court or in which the court's officers hold substantially all the capital stock.

MORE REVENUE ESSENTIAL

In our opinion there is no escape from the following conclusions:

1. The rapid transit (subway and elevated) lines during the fiscal year ending June 30, 1920, will fail to earn their fixed charges by \$8,778,000, as against a surplus for 1917 of \$8,885,359.

2. With an increased fare the rapid transit lines will earn only a small part of the charges upon the bonds and notes, aggregating \$147,000,000, which represent fresh capital invested or to be invested in those lines under the supervision of the Public Service Commission subsequent to March 19, 1913, the date of city contract No. 3.

3. Even an 8-cent fare will not, prior to 1922, provide any substantial surplus over the company preferentials, and even in 1922 such a fare will provide little more than half of the city preferential.

4. Unless there is an immediate increase in fares, the further disintegration of the surface system in Manhattan is inevitable and the operation of many of the lines will have to be discontinued because of their failure to earn operating expenses and taxes.

5. Nothing less than an 8-cent fare with a charge of 2 cents for transfers will provide a sufficient margin above mere operating expenses and taxes to permit of the operation of the surface lines as one system, with reasonable provision for upkeep.

6. Even an 8-cent fare with a 2-cent charge for transfers will not yield a fair return upon the actual investment in the surface lines or upon their reproduction value. For that purpose, a higher fare will be necessary.

7. Neither the rapid transit lines nor the surface lines can be permanently maintained and developed by the operating companies without an assurance of sufficient earnings to justify the investment of the additional capital that will from time to time necessarily be required to keep up with the increasing demands of the traffic of the city.

A statement was published showing the variety of interests that will be affected by default of the company in the payment of any of its obligations.

Hear Pittsburgh Valuation

City and Railway Differ Over Pittsburgh Railway Figures—Commission Closes Case

Counsel for the city of Pittsburgh and the Pittsburgh Railways completed arguments on Dec. 2 on what elements should be included in the physical valuation of the Pittsburgh traction system. The arguments were before the Pennsylvania Public Service Commission. They were of unusual importance, inasmuch as they will determine upon what basis the company will be reorganized, and what rate of fare should be charged. In the closing argument for the company, Attorney E. W. Smith declared the valuation placed upon the company must be high enough to attract some person "with say, \$10,000,000" to finance the rehabilitation of the company.

REPORTS IN CONFLICT

The case before the commission followed the filing of conflicting reports by the several sets of engineers employed in the valuation of the property. The engineers for the city placed the company's legitimate value at \$48,000,000, while the engineers representing the company on the valuation board maintained that about \$73,000,000 is the proper figure.

The arguments opened on Dec. 1. Attorney George E. Alter, for the company, asserted the present fare of 7½ cents for tickets and 10 cents cash is fair and that no successful complaint had been lodged against it. The estimated operating expenses for a year, as allowed by the engineers, were \$14,086,000, he said, and that the recent increase of wages allowed by the National War Labor Board added another \$1,000,000 to that. Taking the city's estimate of a \$48,000,000 valuation, and allowing upon it 7 per cent as the legitimate profit, the total gross revenue necessary would be \$18,446,000, he said. The best estimate for earnings in 1920, Mr. Alter held, was only \$17,093,403, or less than the revenue the company should have. If deprived of a fair return, the company would be driven into the sheriff's hands. Mr. Alter urged that the valuation be based on present-day values.

A. W. Robertson, also for the company, said the traction system hauled 232,000,000 revenue passengers in 1918. He traced the fare increases of the company, and declared that the last advance when the fare system was changed from a zoning scheme to a flat rate, had not been accompanied by any decrease in traffic. He pleaded that the commission permit the inclusion in the valuation of the cost of consolidating the lines in Pittsburgh.

C. K. Robinson, special attorney for the city, took issue with Mr. Robertson's assertion that the resumption of the flat fare had relieved the housing congestion that followed upon the zoning system. He contended that the new rates had decreased riding. There

is no real unification, he said, but a confusion of corporations and interlocking relationships working under operating contracts. He objected to the inclusion of the cost of consolidation in the valuation, and opposed also the use of the superseded property values in the valuation. The superseded property value, he said, has accumulated for years, and the company has continued to earn on it each year; from a point of earning power, he said, it should be eliminated.

Mr. Robinson claimed \$48,000,000 was a generous figure on the values, and that 7 per cent is a fair return. He pictured Pittsburgh as "looking with great interest on the valuation in the hope that it may be a foundation stone for a new era in transportation and development affairs." He asked that depreciation costs of \$16,845,200, useless property estimates of more than \$2,000,000 and financing, organization and developing costs of more than \$5,000,000 be eliminated.

George N. Munro, Jr., for the city, claimed that more than \$15,000,000 was represented in the valuation under the heads of consolidation costs, going concern costs and developmental costs, which were one and the same thing.

\$72,000,000 IN SECURITIES OUTSTANDING

Attorney Smith, speaking in rebuttal for the company, pointed out that the company now has \$41,000,000 in bonds, \$16,000,000 in stock, \$5,000,000 in unfunded debt and \$10,000,000 in debentures outstanding, and that it must have a valuation to take care of its securities. He protested against limiting the company's revenues when other investors demanding from 8 to 10 per cent.

The commission took the case under advisement. The attorneys for the city have been allowed two weeks in which to prepare further briefs. A decision is expected shortly after the first of the year. Upon this decision will depend whether the fare remains at 7½ and 10 cents, or goes, as had been officially suggested to 8½ or 9 cents.

New Jersey Company Suspends Dividends

The Public Service Corporation of New Jersey has announced that the directors deem it prudent to omit the declaration of what would have been, under normal conditions, the last quarterly dividend on its common stock for the year, owing to the many difficulties which the company is encountering in the operation of both the electric railway and the gas branches of the company's business. It is stated, however, that the electric branch of the company is prosperous, but the profits from the sale of electric light and current are not sufficient to offset the losses recorded elsewhere. This in spite of the fact that only recently the company has been granted an increase in gas rates. The dark side of the situation at present, state the directors, is the electric railways.

Houston Valuation Argued

Company and City About \$2,000,000 Apart on Amount on Which Company Is Entitled to a Return

The Houston (Tex.) Electric Company, continuing its contest for higher fares, has filed suit in the Federal Court asking an injunction to restrain the city in its efforts to prevent collection of higher fares. The company alleges that the 5-cent fare is confiscatory, in that for the twelve months ended Sept. 30, 1919, after proper deduction for depreciation is made, there is not one dollar of return for the year.

SPECIAL MASTER TO HEAR CASE

Judge Otis Hamblen has been appointed as master in chancery to conduct a hearing and to take testimony bearing on the question of whether the 5-cent fare is inadequate. In this hearing the question of valuation was of chief importance, and the figures presented by the company's engineers and by the engineers employed by the city were carefully examined and the difference analyzed. The company maintained that present costs and prices of material should be considered as permanent, while the city contended that the present were only emergency costs and would not continue indefinitely.

During the hearing several well-known rate experts testified, among them William E. Tucker of Boston, general counsel for Stone, & Webster; Halbert P. Gillette, editor of *Engineering and Contracting*; C. R. Wharton, Houston, and W. J. Hagenah, Chicago. Reports of other valuation engineers were presented to the master.

Mr. Gillette, who made a valuation of the property last January for the company, found the original cost was between \$5,000,000 and \$6,000,000 and the cost of reproduction new \$7,000,000 to \$8,000,000. The latter valuation is that which the company maintains is correct in view of the prevailing high prices of material and labor.

Another report, presented by Hagenah & Erickson, Chicago, gave practically the same figures for original cost and the cost of reproduction new. This firm was also employed by the traction company. Mr. Hagenah appeared for the company to explain his firm's figures.

ADEQUATE RETURN A QUESTION

The report of Lamar Lyndon, valuation engineer of New York, who was employed by the city of Houston to make a survey and whose report was made as of date of July 1, 1919, gave a total valuation of \$4,983,342, with discounts of \$127,529 allowed on preferred stock, making the grand total \$5,110,771. This is the valuation which the city seeks to establish.

The question of adequate return also figured in the hearing, the company maintaining that the property should yield from 7 to 9 per cent. The city maintained that any return that is not confiscatory should be regarded as adequate, and that a return of 4½ to 5 per cent is not confiscatory.

In explaining his figures, Mr. Gillette went into detail regarding unit costs, reproduction values, straight line depreciation, sinking fund depreciation, enhancement of property values and other angles. The record cost of the property, he said, was \$6,803,508 and the estimated cost totaled \$6,752,584, both of these figures using a development cost of \$2,422,118 with deduction of \$877,210 for depreciation. Mr. Gillette said four-fifths of the present plant had been built since the present owners took charge of the property in 1901, adding that since that date the records were complete as to costs, but that prior to that time the date must be largely estimated.

The city contends that the question of property enhancement due to the operation of the property should be taken into consideration in passing on the question of allowing an adequate return on invested capital.

Arbitrators Increase Cleveland Dividend

By a majority of two to one, the arbitrators conducting the inquiry into the request of the Cleveland (Ohio) Railway for a dividend increase from 6 to 7 per cent have awarded the increase, effective Jan. 1.

City Light Commissioner W. E. Davis, representing the city, was the dissenting member of the board. Joseph R. Nutt, president of the Citizens Savings & Trust Company, appointee of the railway, and Attorney A. A. Stearns, named by United States District Judge D. C. Westenhaver as the independent arbitrator, signed the report granting the company stockholders a 7 per cent dividend.

John J. Stanley, president of the Cleveland Railway, when told of sentiment expressed in favor of a referendum declared:

"We shall not oppose a vote on the amendment to the grant making the award effective if petitions are filed after Council acts. Personally, however, I doubt if such petitions will be filed."

"I believe the city generally appreciates the ten years of good service and low fare which the Cleveland Railway has furnished, and that our patrons know the difficulties we have faced in the last few years of increasing cost and the impossibility of securing money at rates ample ten years ago."

Further, I have supreme confidence in the good faith of the city. The City Council and the administration are already pledged to the award. No referendum was asked on the legislation passed by Council last July, of which this award is the result. The tacit approval by the city will, I am sure, be reaffirmed now."

The preamble of the award is as follows:

"The parties hereto, the Cleveland Railway and the city of Cleveland, are hereby advised that the board of arbitration has heard the testimony and the arguments of counsel and upon consideration of the same they find that the rate of dividend on the capital stock of the Cleveland Railway should be 7 per cent, effective Jan. 1, 1920, and that the franchise ordinance should be amended to conform thereto. Finding and recommendations based upon the testimony submitted and memorandum opinions are filed herewith."

Under the Taylor service-at-cost grant the Cleveland Railway was entitled to a guaranteed return of 6 per

cent on its stock. Under war time conditions the company appealed for an increase in the rate of return as being only fair to the investors and as essential if additional capital were to be obtained from time to time for further development of the company's railway property.

Communities Must Help Toward Restoring Service

The Berkshire Street Railway, Pittsfield, Mass., will not be required to operate the line between the towns of Lee and Huntington, which was abandoned in 1918 because of labor conditions. This is the decision of the Public Service Commission of Massachusetts.

Representatives of the communities formerly served asked the commission to require the road to resume operation. The commission in rendering its decision states:

"This commission recognizes that the abandonment of electric railway service in practically every case involves hardships to the communities which have heretofore enjoyed this service, and even where the company is within its rights in proposing to discontinue its service, the commission has endeavored from time to time by conference with the parties to work out some arrangement which would permit of the retention of the service. . . . Where a line is operated at a loss and this loss is not made good from the receipts from other portions of the company's system, a public demand for continued operation is equivalent to a request for a voluntary contribution or subsidy from the company. Such a request, we believe, cannot fairly be made of an impoverished company unless the communities which are the sole beneficiaries of the service are prepared to share in the responsibilities and the burdens."

Service on the Pittsfield-Great Barrington branch of the Berkshire Street Railway was resumed on Nov. 17.

Ask Receiver for Receiver

George E. Warren, Albert A. Jackson, George E. Barstow, Jr., Herman E. Kountze and John F. B. Mitchell, as holders of \$2,787,000 of the \$3,140,000 of receiver's certificates of the Second Avenue Railway, New York, N. Y., have brought suit in the Supreme Court against that company and its receiver, Andrew E. Kalbach, for payment of the interest due on Oct. 1. As failure to pay interest on time makes the principal also payable, the plaintiffs demand that all of the rights, property, franchises, etc., of the bankrupt road be sold to satisfy the debt.

The Second Avenue Railroad went into the hands of a receiver in September, 1908, along with other surface lines in the city. Two receivers, Messrs. Lynch and Beaver, died while trying to restore the system to a paying basis. Mr. Kalbach was appointed receiver in March, 1917. He was overtaken by war-time conditions.

The Second Avenue Railroad was once a part of the Metropolitan Street Railway, but as it was merely leased, the Metropolitan relinquished it when trouble began for the surface lines in 1907.

Maryland and West Virginia Properties Merged

The Public Service Commission of Maryland, sitting at Baltimore, on Nov. 28 approved the consolidation of seven large gas and electric companies in Northern and Eastern West Virginia and Western Maryland by the Potomac-Edison Gas & Power Company. The properties taken over by this corporation consist of the oil wells, plants, pipe lines, etc., of the Eastern Oil Company, Buffalo, N. Y., the Central West Virginia Gas Company, West Virginia & Maryland Gas Company, the Grafton Light & Power Company, the Grafton Gas & Electric Light Company and the Grafton Traction Company, and the majority of stock of the Hartland Power Company, together with the power plant, electric light, traction and electric railway lines, which center in and about Cumberland, Md.

The merger brings together the power plants and railway lines of Western Maryland and Northern West Virginia, from the Potomac to the Ohio Rivers and it is said will eventually include the Wheeling and Morgantown properties owned by the Barstow interests.

The principal offices of the company will be at Grafton, W. Va.

As explained on page 1019 of this issue the creditors of the Grafton Traction Company held a final meeting recently. Releases will be executed and the property turned over to the new owners in accordance with the instructions for this proceeding which have been laid down by the court.

Sale Under Foreclosure Confirmed

The sale of the uncompleted railway between Belleville and East St. Louis, Ill., originally owned by the Southern Traction Company, to C. B. Cox, president of the Aluminum Ore Company and the Alton & Southern Railroad, has been approved by Judge English in the East St. Louis Federal Court.

The road was sold on July 10 last by the master in chancery of the United States District Court for \$400,000 to Mr. Mephram. Under the terms of the master's sale, Mr. Mephram had until Dec. 17 to complete the purchase, but he transferred his right to Mr. Cox. Of the purchase price \$325,000 has been paid and Judge English cancelled the order requiring the completion of the sale by Dec. 17 and extended the time for payment of the remaining \$75,000 until Jan. 15.

The Aluminum Ore Company owns coal property near Tilden, Ill., 45 miles southeast of East St. Louis. The Southern Traction Company's right-of-way runs within a short distance of this property. Rails were laid about ten years ago from Fourth Street and Broadway, East St. Louis, to Belleville, but passenger service was never installed. Freight trains have run over the line from a point in the east section of East St. Louis to Belleville.

Grafton Properties Taken Over

What is supposed to be the final meeting of creditors of the Grafton Traction Company and the Grafton Light & Power Company took place during the second week of December at the office of Hon. O. E. Wyckoff, referee, at Grafton, W. Va. An amicable agreement was reached by the representatives of the creditors and representatives of the prospective purchasers, whereby the Potomac-Edison Gas & Power Company, referred to elsewhere in this issue is to take over the properties at Grafton upon conditions and for the consideration stated in said agreement.

An order was then drawn up which will be presented to Judge A. G. Dayton at Martinsburg confirming the transfer of the properties at private sale. It is understood this order will be entered at once as Judge Dayton has already been advised of its contents, and has consented to a confirmation of the sale upon the terms contained in the order.

In the meantime the creditors of the two concerns have been busy preparing and executing releases of all claims that constitute liens on either of the properties. Armed with these and a certified copy of the order confirming the sale, Referee Wyckoff and Dr. T. F. Lanham, trustee in bankruptcy, will meet the purchasers and their representatives in New York, where the releases will be delivered upon the purchasers paying over to the trustee \$100,000 in cash, and \$100,000 in bonds of the new company, some of the larger creditors having agreed to accept bonds in part payment of their claims.

This meeting in New York was for Dec. 12, but as the consummation of the deal depends upon the celerity with which the court order is entered, it was decided to leave the date of that meeting open until the order is entered, but not later, however, than Jan. 15.

Details of Oakland & Antioch Reorganization Modification

In an order issued by the Railroad Commission of California the changes in the plans of the reorganization committee having in charge the affairs of the Oakland & Antioch Railway are approved. The order by the commission modifies an order previously issued so as to permit the San Francisco & Sacramento Railroad, the new corporation formed to take over the affairs of the Oakland & Antioch line, to issue not exceeding \$4,000,000 of common stock, \$1,330,000 of 6 per cent preferred stock and not exceeding \$2,100,000 of five-year 7 per cent bonds.

The original plans of the reorganization committee provided for a twenty-year 6 per cent bond issue. The change to the five-year 7 per cent bond, according to the reorganization committee, is due to the present financial conditions and the small demand for bonds of street and interurban railways.

Approximately \$800,000 of the bonds will be sold for cash at not less than

90 per cent of par and the proceeds used for the following purposes:

Payment of first liens and interest thereon	\$300,000
Payment of non-assenting bondholders, estimated	75,000
Additions and betterments, including among other things one-half of the cost of branch to Pittsburg, completing ballast on entire line, concreting tunnel, purchasing five cars and constructing two warehouses, ...	203,500
Working capital	141,500
Total	\$720,000

As much of the common and preferred stock as may be necessary and not exceeding \$1,300,000 of bonds are to be distributed to the bondholders of the Oakland, Antioch & Eastern Railway, Oakland & Antioch Railway and San Ramon Valley Railroad, as provided in the original reorganization plan.

The reorganization plan was declared operative in February last. The details of the plan as presented to the Railroad Commission by the company were reviewed in the ELECTRIC RAILWAY JOURNAL for May 17.

First Surplus for Dallas

The Dallas (Tex.) Railway for the first time since its operation under the service-at-cost franchises earned the full 7 per cent return authorized under the terms of this franchise, during October, according to the report of Grover C. Bland, chief accountant in the office of the supervisor of public utilities.

The return after all necessary and authorized appropriations were made was \$59,607. The agreed property valuation, plus authorized additions for betterments and improvements, is \$8,560,749, on which the authorized return of 7 per cent would amount to \$49,937. During the twenty-five months of operation under this franchise there has accumulated a deficit in authorized return of \$430,713.

The franchise provides that after a certain part of the surplus over the authorized 7 per cent return is added to the maintenance and repair fund each month, surplus may then be used to wipe out the accumulated deficit. There is a deficit in the maintenance and repaid fund and none of the October surplus can be used toward wiping out the accumulated deficit.

In explaining this feature of the franchise, Mr. Bland said:

Attention is called to the fact that the balance remaining after the payment of the 7 per cent authorized reserve was added to the repair, maintenance and depreciation reserve, and not applied against the accumulated deficit in the authorized return. The franchise provides that each month, after paying operating expenses, making appropriations of .16 per cent and 6 per cent of railway gross earnings, respectively, to the repair, maintenance and depreciation reserve and accident reserve, and paying the 7 per cent authorized return, the surplus earnings remaining shall be added to the repair, maintenance and depreciation reserve until the total additions thereto from all sources for the period subsequent to Jan. 1, 1918, shall amount to 18 per cent of the total railway gross receipts derived during such period. The total appropriations to the repair, maintenance and depreciation reserve during this period have been only about 11 per cent of the railway gross earnings, and this deficiency must be made good before any of the surplus earnings could be applied against the deficit in the 7 per cent authorized return.

Toledo Bonds Called for Payment

The Toledo Traction Light & Power Company, Toledo, Ohio, has called for payment on Jan. 1, 1920, the outstanding principal amount of second lien 7 per cent three-year gold bonds, dated Jan. 1, 1918.

Under the terms of issue the holder of these bonds will have the right to convert on or prior to Dec. 26, 1919, into Cities Service Company preferred and common stocks on the following basis: Each \$100 principal amount of Toledo Traction Light & Power Company second lien 7 per cent three-year gold bonds may be converted into \$85, par value, of Cities Service Company preferred stock and \$15, par value, of Cities Service Company common stock with adjustment of interest.

The conversion privilege will apply only to such bonds as are presented and surrendered on or before Dec. 26, 1919. On and after Dec. 26, 1919, the conversion value of these bonds will cease and holders who do not convert will receive on Jan. 1, 1920, only the principal amount of the bonds and accrued interest thereon.

The Cities Service Company preferred and common stocks issued in conversion of Toledo Traction Light & Power Company second lien 7 per cent three-year gold bonds surrendered for conversion prior to Dec. 15, 1919, will be entitled to the dividends payable on Jan. 1, 1920, but stocks issued in conversion after Dec. 15, 1919, will not be entitled to the dividends payable Jan. 1, 1920.

The Toledo three-year second lien bonds were sold to investors at 97. Computing the cash and stock dividends to be received on the stocks into which these bonds will be converted, the holder of Toledo convertible 7's will receive a net return of approximately 16 per cent per annum after conversion.

Since the above announcement there has been offered for subscription at 99 and interest, to yield over 7½ per cent, an issue of \$10,000,000 Toledo Traction, Light & Power Company, first lien, 7 per cent, two-year bonds.

Philadelphia Net Increased

The Philadelphia (Pa.) Rapid Transit Company reports earnings as follows:

	1919	1918
November		
Operating revenue, \$	3,055,953	\$ 2,717,880
Operation and taxes	2,065,139	1,785,521
Operating income \$	990,814	\$ 932,359
Non-operating income	42,029	47,041
Gross income ... \$	1,032,844	\$ 979,401
Fixed charges	813,854	808,535
Net income \$	218,989	\$ 170,866
Eleven Months Ended Nov. 30		
Operating revenue, \$	32,216,937	\$28,253,423
Operation and taxes	22,094,180	18,669,287
Operating income \$	10,122,756	\$ 9,584,135
Non-operating income	483,341	567,522
Gross income ... \$	10,606,098	\$10,151,657
Fixed charges	8,923,349	8,825,994
Net income \$	1,682,748	\$ 1,325,663

Financial News Notes

Kansas City Sale Postponed.—The disposition of the Kansas City Outer Belt Railroad, which was to have been sold under foreclosure a few weeks ago, has been indefinitely postponed.

New Boston Elevated Director.—Henry S. Lyons has been elected a director of the Boston (Mass.) Elevated Railway, succeeding E. V. R. Thayer. Mr. Lyons has been secretary of the corporation for a number of years.

Indiana Road Abandoned.—C. J. Dunn, general superintendent of the Indiana Utilities Company, Angola, Ind., writes that the Lake James Railroad has been abandoned and that it did not operate during 1919.

Abandonment Authorized.—The Caldwell (Idaho) Traction Company has been authorized by the Public Service Commission to discontinue its Lake Lowell branch. The branch is less than 2 miles long. It was built to serve a resort that has been abandoned.

Refunding Issue Authorized.—The Public Service Commission of Massachusetts has authorized the Worcester & Webster Street Railway, Webster, Mass., to issue \$150,000 of first mortgage 5 per cent twenty year bonds, the proceeds to be used to take up a like amount of bonds due on Dec. 1.

Loan Granted to Cincinnati Traction Company.—The City Council of Cincinnati, Ohio, has passed, by a majority of twenty-five, an ordinance authorizing the Cincinnati Traction Company to borrow money to pay outstanding deficiencies and to grant the company an extension of twenty-five years in which to repay the losses.

Winnipeg Value \$12,934,293.—The present value of the Winnipeg (Man.) Electric Railway's holding, exclusive of land, rolling stock, gas properties and "intangible capital," according to the appraisal just completed by the Manitoba Public Utilities Commission experts, is \$12,934,293. To replace the holdings, however, would cost \$15,724,501.

Suspension of Line Authorized.—Job E. Hedges, appointed receiver of the New York (N. Y.) Railways by Federal Judge Mayer, has been authorized by the court to suspend operation on the Canal Street line, on which service has been continued for some time past to comply with the provisions of the franchise. It is said that the cost of operation has greatly exceeded the revenues from the line.

Pascagoula Property Being Scraped.—E. J. Ford, who recently bought the property of the Pascagoula Street

Railway & Power Company, Pascagoula, La., has sold it to A. Patterson and associates, who are taking up the rails. The rolling stock and other material have already been sold. It is stated that the light, water and ice properties will be continued in operation.

Common Stock Dividend Increased.—The Eastern Texas Electric Company, Beaumont, Tex., has declared a semi-annual dividend of \$4 a share on the common stock, payable on Jan. 2 to stock of record of Dec. 15. This places the outstanding \$1,400,000 of common stock on an 8 per cent annual basis. Previous dividends have been at the rate of 5 per cent per annum.

Eastern Massachusetts Abandons Line.—The Eastern Massachusetts Street Railway, Boston, Mass., has discontinued service on its lines from Bridgewater to New Bedford and has abandoned all but 3 miles of the line from Taunton to Bridgewater. Cars which have been operating between Providence and Bridgewater now make their eastern terminus at the monument in Raynham Center.

Temporary Receiver at Brunswick.—Samuel C. Steinhart and Oliver Lisman, New York, N. Y., have been appointed temporary receivers of the City & Suburban Street Railway, Brunswick, Ga., by order of Federal Judge Evans, under a petition of Columbia Trust Company, New York, and the Mutual Light & Water Company, of Brunswick. A hearing for a permanent receivership will be held on Dec. 22.

Permanent Receiver of Company.—The appointment of William L. Doyle, Easton, Pa., as receiver for the Northampton, Washington & Easton Traction Company has been made permanent by Judge Rellstab in the United States District Court. The temporary appointment was made upon application of the Bankers' Trust Company. The affairs of the company were reviewed briefly in the *ELECTRIC RAILWAY JOURNAL* for Nov. 15, page 953.

Judgment Against Interurban.—Judge M. J. Wade, in the Federal Court, recently handed down a judgment against the Clinton, Davenport & Muscatine Interurban Railway, in favor of the Tri-City Railway & Light Company, Davenport, Ia. The decision gives the Tri-City Railway a chance to sell the entire Muscatine line and thus collect the amount of the judgment. The Muscatine lines have been idle since Aug. 1.

Protective Committee for Corpus Christi.—A committee consisting of John Gribbel, chairman; Louis J. Kolb, J. C. Neff, John J. Anderson and John S. Bowker has been formed in the interest of the bondholders of the Corpus Christi Railway & Light Company, Corpus Christi, Tex., placed in the hands of receivers as noted in the *ELECTRIC RAILWAY JOURNAL* for July 20. Deposits of bonds are to be made with Fidelity Trust Company, Philadelphia, Pa.,

which will issue certificates of deposit.

Massachusetts Road in Liquidation.—The Swansea & Seekonk Street Railway, Swansea Centre, Mass., has surrendered its charter for the appointment of a receiver to wind up its affairs. Dr. E. C. Kellogg, president, Willard C. Gardner and Herbert H. Marble, comprising the executive committee of the board of directors, have immediate charge of the business of closing the company's affairs. They will carry out the two sales of company property contemplated. The railway equipment is to be sold to the McGovern & Company, of New York City, and the real estate which includes the carhouse, to George H. Waring.

Receiver Discharged.—John T. Coghlan, receiver of the Northern Electric Railway, Chico, Cal., was discharged from that post on Dec. 1 by Federal Judge William C. Van Fleet. Mr. Coghlan reported to the court that the affairs of the company had all been successfully wound up and that there were no further duties for him to perform. The Northern Electric Railway and allied companies were placed in the hands of Mr. Coghlan as receiver on Oct. 5, 1914. The sale of the properties under foreclosure was made on May 28, 1918, to the Sacramento Northern Railroad.

Foreclosure Sale Dec. 29.—All property of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., will be placed on sale at public auction at Fort Wayne on Dec. 29. The company has been in the hands of a receiver for two years and the court of Allen County has ruled that the sale shall be held on the date named. The plan for carrying out the financial rehabilitation of the company is that advanced by the committee representing the holders of the thirty-year first consolidated 5 per cent bonds of the Fort Wayne & Wabash Valley Traction Company under terms outlined in the *ELECTRIC RAILWAY JOURNAL* for Aug. 30, page 450.

Reorganization Effective Jan. 1.—The property of the Buffalo Southern Railway, Buffalo, N. Y., which has been in the hands of N. A. Bundy as receiver, was sold recently to interests representing the Erie County Traction Company, which will take possession on Jan. 1. The system consists of 25 miles of road extending out of Buffalo. A receiver was appointed on Sept. 26, 1913. The old company had outstanding \$547,000 of stock, \$600,000 of funded debt and \$41,800 of receiver's certifications. The new company will have outstanding \$450,000 of stock and \$100,000 of bonds. The reorganization plan as proposed by the representatives of the bondholders has been approved by the Public Service Commission. Under it the amount of securities outstanding per mile of track will be reduced from about \$46,000 to \$22,000. Interest requirements, moreover, are cut from about \$32,000 to \$6,000 a year.

Traffic and Transportation

St. Joseph Fares Increased

Missouri Commission Grants Seven-Cent Rate—Eight-Cent Advance for Trainmen

Fares on the lines of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., were raised from 5 cents to 7 cents on Dec. 1 under authority of the State Public Service Commission. On the same date a new wage scale became effective for conductors and motormen. The question of wages for linemen remains to be settled.

The commission's ruling is to remain in force until Jan. 1, 1921, when an application to extend the time or to make the rate permanent will be in order. The company will sell tickets at the rate of two for 13 cents. Fare for children is raised to 4 cents, with eight tickets for 26 cents.

RETURN OF 5.9 PER CENT

The commission estimated that the new rates would produce enough revenue to give the company a return of 5.9 per cent on the present value of the property after allowing 3 per cent, for depreciation. The company's request for an increase in light and power rates was denied. The company, which filed its application for a 6-cent fare with the commission a year ago, later asked for one of 8 cents.

In fixing the rate at 7 cents the commission said:

We find that the above rates are about all that the traffic can bear. All of the street railway lines of the St. Joseph Railway, Light, Heat and Power Company are short. An increase in fares over the above schedule would only result in decreased net revenue. There are three parties in this matter—the public, the company and the employees. It was after the full and careful consideration of all that this award was made.

The new wage scale, which will give the employees an estimated increase of \$112,000 a year, is satisfactory to the men, according to B. F. Kohler, president of the union. The question had been submitted to the commission by agreement between the company and its employees. The settlement of the wage dispute between the company and the linemen will now be taken up.

EIGHT-CENT WAGE INCREASE

The new scale for conductors and motormen follows: First six months, 40 cents an hour; second six months, 46 cents; second year, 48 cents; third year and thereafter, 50 cents. One man car operators are to receive 4 cents above the scale.

A year ago the federal war labor board awarded the men the following scale: First three months, 38 cents an hour; next nine months, 38 cents an hour; next nine months, 40 cents; thereafter, 42 cents.

The new scale is an increase of 2 cents an hour for beginners and 8 cents an hour for employees who have been with the company more than two years.

The scale which the motormen and conductors had asked was as follows: First three months, 55 cents an hour; next nine months, 60 cents an hour; thereafter, 65 cents an hour. The maximum of the new scale is 15 cents less an hour than the maximum asked by the men.

Massachusetts Jitneys Lose

Two important decisions in what was virtually a test case between jitney bus owners and the Eastern Massachusetts Street Railway were rendered on Dec. 12, by Judge Carroll of the Supreme Bench of the State of Massachusetts. These decisions were handed down in the case technically known as Burgess vs. the city of Brockton, Burgess being the owner of a jitney bus formerly operating in the city of Brockton and who had been forced to cease service as the result of the decision of the Brockton City Council abolishing jitney operation.

The first decision pertained to the legality of the hearing given to jitney owners concerning the abolishing of operation of jitney service within the limits of the city of Brockton. The testimony developed that while no published legal notice had been circulated, ample publicity concerning the proposed action of abolishing the jitneys had been given through the local papers and that the authorized agent of the jitney owners had appeared before the City Council and had asked for a hearing. Furthermore a letter from the agent as well as one from the president of the jitney drivers' union concerning the proposed public discussion had been received by the Council.

CITY COUNCIL UPHELD

Judge Carroll in his decision held that when the authorized agent appeared before the City Council for the discussion of jitney matters the association was legally represented and that the decision of the City Council in abolishing the jitney service is valid.

The second decision was rendered on the motion of the attorney representing the jitney bus owners, to appeal to a full bench of the State Supreme Court, and petitioning for an order to allow the jitney service to be resumed pending the outcome of the appeal.

In this case Judge Carroll declared that he could not consider an order to restore the jitneys to the streets of Brockton since he presumed that the City Council had acted legally in establishing an ordinance abolishing operation within the city limits.

Portland Needs Relief

Report of City's Engineer Urges the Granting of Higher Fare to Save Company from Bankruptcy

A higher fare is imperative for the Portland Railway, Light & Power Company, Portland, Ore., if the company is to be saved from bankruptcy. This is the conclusion arrived at by J. P. Newell, an engineer employed by the city authorities to investigate the company's affairs, who has just filed his report. Mr. Newell declares that to preserve the financial integrity of the company, a small charge for transfers may be required in addition to a fare increase.

The company some time ago presented arguments before the State Public Service Commission for an increase in fare from 6 cents to 8 cents. The commission has as yet given no decision in the case. Mr. Newell's report indicates that the company is operating at a monthly loss, estimated at approximately \$85,000. It is pointed out that unless relief is granted, the company cannot avoid receivership.

DISINTEGRATION THREATENED

Mr. Newell expresses the opinion that the prospect of putting the company through bankruptcy proceedings presents a grave situation, as the railway system is made up of three principal companies, besides scattering small ownerships. Each of the properties is covered by separate bond issues, and in case of default Mr. Newell expresses the opinion that a vigorous plea will be made to secure the appointment of a separate receiver for each of the constituent companies. If such a request were granted, the three systems would be operated independently, with consequent curtailment of the transfer privilege.

Mr. Newell's report was based upon an investigation of several months which included every phase of the company's affairs. Not only were the company's records probed, but separate investigations were made to ascertain the facts in the case. Mr. Newell's report shows that the company's statements to the Public Service Commission in regard to earnings and expenses have been verified. It shows that the company will be required to expend \$45,000 each month on track maintenance next year. Moreover, operating expenses have been greatly increased by the wage advance of 6 cents an hour recently granted to trainmen and announced in the *ELECTRIC RAILWAY JOURNAL* for Nov. 15, page 949.

Mr. Newell recommends for relief to the company, the following program:

A small charge for transfers; establishment of a central zone for free transfers, with a transfer charge on all traffic originating outside of it.

Authorization of such fares on lines built to develop land values in thinly-settled districts as will pay the cost of operation, or, failing that, their abandonment. Establishment of one-way traffic, re-arrangement of loops in center of city to avoid unnecessary crossings, and adoption of traffic regulation which will facilitate the movement of cars without undue increase of maximum speed.

\$128,000 Increase in November

This Is Result in Connecticut for First Month Under Zone Fares—System Protested

The Public Utilities Commission of Connecticut began hearings on Dec. 8 on the petitions of various cities and towns served by the Connecticut Company in opposition to the zone system as recently adopted. The company concluded its case on Dec. 9, when cross-examination of its witnesses began. It was expected that this would be finished on Dec. 15. The petitioners were to begin the presentation of their case on Dec. 18.

Although the company would have been within its rights in requiring the petitioners to specify their objections and prove that the rates now in effect are unreasonable or the service inadequate, it waived these rights and immediately presented its justification of the new system and the rates charged under it.

Up to date there has been nothing to show what the petitioners want, or what they object to. The public interest in the hearings has not been keen, and the only attendants at the hearings have been the witnesses, lawyers for the company and the petitioners and newspapermen, with an occasional spectator.

The chief opponents to the zone system are certain residents of the town of Manchester, who for years have enjoyed a commutation rate for rides between Manchester and Hartford. When the zone system was put in effect on Nov. 2, the company abolished all reduced rate tickets, and the Manchester commuters organized a committee which raised money to engage an attorney to fight the zone system. Boards of Aldermen and City Councils in Bridgeport, New Haven, Stamford and other places also filed protests against the new system, although they specified nothing in their complaints. At a conference of the attorneys representing the different petitioners it was decided to allow the attorney for the Manchester commuters to do the cross-examining of the company's witnesses.

COMPANY'S CASE PRESENTED

Evidence was submitted by the company to show that the zone system was established after a very careful survey of traffic and other conditions on the company's lines, and that the zone system was in fact a suggestion of the people, whose representative in the 6-cent fare case in 1917 advocated the retention of a minimum base fare for riding in city territory and the division of outlying territory into zones, with charges to be made according to the distance traveled by the rider.

Lucius S. Storrs, president of the Connecticut Company, asserted that the system had proved satisfactory and popular. He testified that in November, the first month of its trial, the company's income had increased \$128,000 over the same month in 1918, or about 17 per cent. This was not enough to

make possible the payment of back taxes and other obligations of the company, but it was very encouraging. He testified as to the manner in which the zones had been determined, and asserted that in his opinion the zone system was the fairest method of charging for electric railway transportation.

Under cross-examination Mr. Storrs asserted that it was not to the advantage of the company to grant a preferential commutation rate to any riders, holding that electric railway service in itself is a commutation service, and that the company could not afford to carry passengers at a loss.

J. K. Punderford, vice-president and general manager of the company, said that the company "hoped" for an increase of about \$1,500,000 a year in its revenues through the zone system. Asked if he thought the company had given the 6-cent fare a "fair trial," Mr. Punderford said it had given it a dangerously long trial.

Walter J. Flickinger, assistant to the president, testified to the manner in

which the company prepared for the zone system. He presented maps illustrating the studies of population, traffic flow, density of traffic and other features and described fare collection systems in use in other parts of the country.

Thomas J. McGreevy, assistant comptroller of the company, testified to certain financial statistics of the company. Mr. Flickinger and Mr. McGreevy were to be cross-examined on Dec. 15.

So far the hearing has developed no serious opposition to the zone system except in a general way, some of the opposition being described as "political" by one of the witnesses.

The commission announced that after the testimony had been presented regarding the general features of the zone system hearings would be held in Hartford and New Haven, and possibly in Bridgeport, when local complaints such as the location of specific zone limits, etc., would be taken up.

Witnesses for the company all expressed appreciation of the co-operation of the employees and the public in putting the new system in effect, and asserted that were it not for this co-operation the new plan would have been far less satisfactory.

Flat Fares Restored in Jersey

Seven Cents Cash, One Cent for Transfer, Authorized—Commission Says Zone Plan Had Insufficient Trial

Faced with the prospect of receivership unless some means were found of immediately increasing its revenue, the Public Service Railway on Dec. 7 abandoned the zone system and returned to a flat fare of 7 cents, with 1 cent for a transfer. The change was permitted under an order of the New Jersey Board of Public Utility Commissioners issued on Nov. 29. The board's action was announced in the *ELECTRIC RAILWAY JOURNAL* for Nov. 15, page 957.

The Public Utilities Commission issued its order after Thomas N. McCarter, president of the company, had declared at a hearing that the five-and-one plan, under which the fare was 5 cents for the first two zones and 1 cent for each succeeding zone, with 1 cent for a transfer, was resulting in a loss of \$3,000 daily as compared with the former "three-and-two" zone plan and of \$12,000 daily when compared with the flat 7-cent fare.

For the first seven days under the plan, which became effective on Nov. 16, the company's revenue was \$378,198. The receipts under the "three-and-two" plan during the last week of its trial were \$400,387. The estimated receipts that would have accrued under the flat 7-cent fare with 1 cent for a transfer would have totaled \$462,206.

Mr. McCarter told the commission that to avert the chaos which would result if the Public Service Railway went into receivership, the financial backers of the company would advance the \$750,-

000 needed on Dec. 1 to meet bond interest payments. They insisted, however, that the zone system be abandoned and that a flat 7-cent fare be restored. He stated that, unless the flat fare was restored, the loan would be unavailable and that a receivership would follow.

COMMISSION FAVORS ZONE PLAN

Although permitting the company to abandon the zone system, the commission stated in a memorandum made public on Dec. 2, that in its opinion the zone plan had not received a fair trial. The trial under existing conditions, said the board, had been insufficient and unfair, and had not received the full support either of the company or of the public. The commission did not sustain the contention of platform men that the system was impracticable from an operating standpoint. The memorandum said in part:

We believe that with co-operation the plan proposed would at least have had a fair trial. It does not follow that the plan proposed would be adaptable in all its details or solve fully the problem satisfactorily either to the public or to the company. With a fair trial of the plan proposed, however, adjustments could be made, and the experience which could be obtained would furnish data which could be submitted to and studied by the experts engaged by the public and the company. Some plan acceptable to the public and the company might thus have been evolved. That the plan has not had a fair trial, however, must be conceded.

The circumstances which were present during the experiment of the plan with the schedule of rates first permitted to be charged were sufficiently dealt with in our former report to avoid the necessity of repetition here. As a sequence to these

circumstances may be assigned the attitude of the platform men in applying for the abrogation of the system since the recommendation of this board of the present schedule of rates thereunder. The board is not convinced that the details to which the platform men objected present difficulties that make the plan impractical from an operating standpoint. Reasonable support and co-operation on the part of the platform men as well as the public are important, if not essential, for the success of the plan. It is evident that this co-operation will not be given and the board cannot compel the same.

We are, therefore, of the opinion that neither a sufficient nor a fair trial of the plan under the existing rates has been had or under present conditions is practicable. The trial, however, has alike been costly to the company as well as to the principle involved. By its calculations, the company shows that under the present plan with the present rates at the end of the present year it will have an actual operating loss of \$750,000, after the payment of fixed charges and taxes, exclusive of any sum whatsoever for depreciation reserve.

A careful analysis of these figures is not necessary, as it is evident that neither rate under the zone plan has yielded as much as the flat rate of seven cents would have yielded had it been continued in effect. Neither is it necessary to determine whether the flat rate of 7 cents with 1 cent for a transfer will yield the amount of revenue which the company estimates it will yield. The company's officials believe that it can "pull through" until the pending proceedings are finally determined and are satisfied to be permitted to make such a change.

The commission, while it indorsed the zone plan in principle and believed that, given a fair trial, it would work successfully, stated that the continuation of the system under present conditions was inadvisable. Of the financial aspects of the case it said:

It is evident that the company's receipts under the zone plan are not sufficient for it to remain solvent. The bankruptcy of an important public utility is always accompanied by adverse conditions which affect not only investors in its securities, but the public served by it. That a public utility may remain solvent is not controlling in fixing its charges, but the board cannot, with the knowledge that bankruptcy would likely result, insist upon a rate unless it clearly appears that the rate is just and reasonable and should be imposed without regard to its effect upon the securities of the company.

As has been stated heretofore, the board is now conducting a proceeding which will result ultimately in the fixing of a rate just and reasonable to the public and which will afford a fair return to the company upon the value of its property used and useful in the service of the public. The board does not have sufficient evidence to justify it in determining that the existing rate is one which can be ordered continued without regard to the imminent insolvency of the company.

In view of all the facts and circumstances involved, the board regrets that for the time being, at least the zone plan, the principle of which has commended itself to our judgment, must be discontinued and the rates of fare in effect before its adoption again charged.

The return to a flat fare was accomplished with little confusion. The company has changed its cars back from "pay-as-you-leave" to the "pay-as-you-enter" type. Cash registers and other equipment used under the zone plan have been removed and will be sold.

The commission will continue the valuation hearings as a result of which it hopes eventually to fix a permanent fare.

Mr. McCarter on Dec. 17 announced that the total loss sustained by the company under the zone system amounted to approximately \$1,500,000. He stated that, under existing conditions and with a 7-cent fare the company should prove self-supporting. He believed that the valuation proceedings would be concluded early in 1920.

Columbus May Ask Six-Cent Fare

L. D. Hutchins, chairman of the board which is arbitrating wage differences between the Columbus Railway, Power & Light Company, Columbus, Ohio, declared before the City Council on Dec. 4 that the company was preparing to ask an increase in fare. According to Mr. Hutchins the company is drafting an ordinance providing for a 6-cent cash fare with six tickets for a quarter. Mr. Hutchins appealed to the Council to support the ordinance when it was submitted, since he said, the board of arbitration could grant no wage increase until higher fares were authorized.

The average wage of employees is now 43 cents an hour. Mr. Hutchins intimated that the arbitrators had agreed on a new scale, but were waiting for the city authorities to take action on the fare question before announcing their decision. To grant higher wages, he said, would lead to bankruptcy at the present fare of 5 cents with eight tickets for a quarter. He declared that operation of the railway department had resulted in a loss of \$199,361 for the first eight months of 1919 and that, at the present wage scale, the loss for the year would amount to \$265,814. He stated that if the fare were increased the company should be able to expend \$500,000 annually on street improvements.

Transportation News Notes

Tokens in Bloomington.—The Bloomington & Normal Railway, Bloomington, Ill., has adopted the use of metal tokens, which are sold four for 25 cents. The tokens replace the strip tickets formerly issued. The cash fare is 7 cents.

Eighteen Cents on Vermont Interurban.—The City Council of Montpelier, Vt., on Nov. 28 authorized the Barre & Montpelier Traction & Power Company to charge 18-cent fares between Montpelier and Barre. The fare in the cities is 6 cents.

Five Cents in Charlestown.—The Boston (Mass.) Elevated Railway has established a 5-cent fare on its line between Sullivan Square and Hanover Street via Haymarket Square and Sudbury Street, Charlestown. The new fare became effective on Nov. 29.

Back to the Skip-Stop.—The skip-stop system has been put into effect on the United Railways, St. Louis, Mo., as a coal conservation measure. Supervisors reported that there was little confusion. Most persons remembered where stops were made under the system during the war.

Seven Cents in Charleston.—The City Council of Charleston, S. C., has

ratified an ordinance granting the Charleston Consolidated Railway & Lighting Company the right to charge 7-cent cash fares. The higher rate went into effect on Nov. 12. Four tickets are sold for 25 cents. Transfers continue to be given free.

Wants Seven Cents in Chattanooga.—Attorneys for the receiver of the Chattanooga Railway & Light Company, Chattanooga, Tenn., have asked the federal court for permission to apply for an increase in fares from 5 cents to 7 cents. In addition to raising the fare the company would charge 2 cents for transfers.

Would Raise Zone Fares.—The Omaha & Southern Interurban Railway, which operates lines between Omaha and Fort Cook, has filed an application with the Railway Commission of Nebraska for an increase in fares from 5 cents to 7 cents in each of the three zones. The company would sell four tickets for 25 cents.

Higher Petroleum Rate Refused.—The California Railroad Commission has denied the application of the Pacific Electric Railway, Los Angeles, for an increase in rates for transporting petroleum products in car-load lots. The company asked permission to install rates on a parity with those charged by the roads under Federal control.

More One-Man Cars in Brooklyn.—The use of one-man safety cars in Brooklyn, N. Y., has been extended to the Montague Street lines of the Brooklyn City Railroad. Additional cars are being received from time to time. A description of the technical features of the cars was published in the ELECTRIC RAILWAY JOURNAL for Oct. 25.

Seven-Cent Zones on Interurban.—The Public Service Commission for the Second District has granted the petition of the Geneva, Seneca Falls & Auburn Railroad, Seneca Falls, N. Y., to increase fares. The fare on the zones outside of Geneva will be 7 cents. In Geneva the 6-cent fare, which has been in force for some time, will be continued.

Higher Fares in Burlington.—The voters of Burlington, Ia., at a special election on Nov. 24 approved an ordinance granting the Burlington Railway & Light Company permission to install a fare of 7 cents with four tickets for 25 cents. At a previous election in October the ordinance was rejected. The increased rate became effective on Nov. 27.

Another Eight-Cent Road.—The Southern Pennsylvania Tracton Company, which operates the city lines in Chester, Pa., and connects Wilmington and Darby, has filed with the State Public Service Commission a new tariff raising fares from 6 cents to 8 cents. The increase is asked to meet the wage advance of 10 cents an hour recently granted to the employees.

City Agrees to 7-Cent Fares.—The City Council of Oswego, N. Y., has agreed to suspend the present franchise of the Empire State Railroad for a period of two years, thus permitting

the company to charge a 7-cent fare on the Oswego city lines. The company will be asked to furnish ten-minute service during rush hours. An 8-cent fare had been asked.

Skip-Stop to Go in Memphis.—The City Commission of Memphis, Tenn., has ordered the Memphis Street Railway to abandon the skip-stop on its lines. Several thousand persons signed a petition asking that the company be compelled to stop its cars at all street intersections. The company has obtained a temporary injunction restraining the city authorities from enforcing the order.

Fares Up in Alabama Towns.—The Alabama Public Service Commission has authorized the Alabama Power Company and the North Alabama Traction Company to raise fares on their lines in Huntsville, Decatur, Anniston and Albany. In Decatur and Albany a 7-cent fare will be charged, while a two-zone system will be established in Anniston with a 5-cent fare for a ride within each zone and a 10-cent fare for one in the two zones.

Seven Cents in Quebec.—A 7-cent cash fare was approved for the Quebec Railway, Light & Power Company, Quebec, Que., on Nov. 24 when a contract providing for the increased rate was signed by the Mayor of the city and by W. J. Lynch, general manager of the company. The company will sell four tickets for 25 cents and seventeen tickets for \$1. Limited tickets will be sold at the rate of six for 25 cents. School tickets will be sold ten for 25 cents.

Tickets for Danbury.—The Danbury & Bethel Street Railway, Danbury, Conn., has put in use books of twenty-one tickets, each ticket good for the 7-cent fare, which are sold at a saving of one fare. Books of twenty-two tickets, each good for a 10-cent fare, can be purchased at a saving of two fares. The 10-cent ticket is good for a ride between Bethel and Lake Kenosia, while the 7-cent ticket will be accepted for a ride within the first fare district.

Skip-Stop Ended in Dallas.—The City Commission of Dallas, Tex., has passed an ordinance formally abolishing the skip-stop system on the lines of the Dallas Railway within the city limits. The skip-stop has not been in use for several months, during which time the public was given a sixty-day trial of the former system of stopping at every block. A referendum was then taken on the question, which showed the patrons were overwhelmingly opposed to the skip-stop.

Cleveland Ticket Rate Reduced.—The Cleveland (Ohio) Railway on Dec. 15 began the sale of six tickets for 25 cents. The cash fare remains at 5 cents. The 1-cent charge for a transfer is retained. The company, which operates under the Tayler cost-of-service plan, formerly sold eleven tickets for 50 cents. A test of public sentiment indicated that citizens desired the lower rate rather than to have extra revenue diverted

to other than necessary extensions. The company has been awarded an increase in the dividend rate to 7 per cent.

Transfers Abolished in San Antonio.—Transfers have been abolished on the lines of the San Antonio (Tex.) Public Service Company through an agreement with the city authorities. The company will give the new plan a sixty-day trial and, if it works successfully, will accept the elimination of transfers in place of a fare increase. It recently obtained an injunction from Judge Duval West in the Federal District Court restraining the city from interfering with the collection of fares in excess of 5 cents.

Six Cents in Spartanburg.—The South Carolina Light, Power & Railways Company, Spartanburg, S. C., has announced that it will raise the fares in that city from 5 cents to 6 cents. The increase will be made under the terms of an ordinance passed recently by the City Council authorizing the company to install a maximum fare of 7 cents. The people of Spartanburg at an election called by the City Council several months ago voted against authorizing the railway to increase its fare.

Eight-Cent Fare Too Low at Walla Walla.—The Walla Walla (Wash.) Railway has announced that as a result of the rapid increase in the use of automobiles by the residents of the city, the company can no longer operate with an 8-cent fare, and that unless some step is taken to grant relief, it will discontinue operation in January. The State Public Service Commission has recommended that the city lease the lines and continue their operation for the time being, or until such time as a plan is devised to put them on a self-sustaining basis.

Rhode Island Appeal Postponed.—The Supreme Court of Rhode Island has postponed to Jan. 16, 1920, the hearing of the appeal taken by nine Rhode Island cities and towns from the order of the State Public Utilities Commission granting the Rhode Island Company, Providence, permission to charge 6-cent fares. The court allowed the postponement to give counsel representing the municipalities and the company more time for the preparation of briefs. The company is now charging the 6-cent fare authorized by the commission.

More Transfers Abolished.—Federal Judge Mayer has granted the application of counsel for Job E. Hedges, receiver of the New York (N. Y.) Railways, for authority to cease exchanging transfers with the Fifty-ninth and Grand Street crosstown lines and the West Side Belt Line, operated by the Third Avenue Railway. The consent of the Public Service Commission for the First District will also be necessary in connection with the Fifty-ninth Street line because there the transfer system was the result of an agreement based upon a division of the fares received.

Would Abolish More Cleveland Stops.—Fielder Sanders, Street Railway Commissioner of Cleveland, Ohio, has under consideration a plan for eliminating a number of the present car stops on the lines of the Cleveland Railway. His plan by speeding up running schedules in outlying parts of the city, would, it is felt, serve as a partial solution of Cleveland's traffic problem. Commissioner Sanders, with the aid of officials of the company, is making a survey of the entire system and plans to present an exhaustive report on the subject to the new City Council, which takes office on Jan. 1.

Zone Fares on Long Island Interurban.—The Public Service Commission for the First District of New York on Dec. 11 authorized the Long Island Electric Railway, New York, N. Y., to establish a zone system under which the fare between Jamaica and Far Rockaway, on Long Island, will be raised from 10 cents to 15 cents, and between the New York city line and Belmont Park from 5 cents to 10 cents. In granting the increases the commission took the stand that the company's franchises contain no provision limiting the fare. The increased fare is estimated to yield approximately \$45,000, or only about two-thirds of the amount needed, according to the commission's own figures, to cover operating expenses and taxes.

Revised Holyoke Fares Approved.—The Public Service Commission of Massachusetts has authorized the Holyoke Street Railway to put into effect the revised zoning system on its Holyoke local lines under which the fare in each zone will be placed at 6 cents and free transfers will be abolished. Under the zone system as approved by the commission last December, the company's system was divided into eleven zones, the central zone embracing the central part of the city and certain populous centers, such as Fairview and Willimansett. The fare in this zone was placed at 7 cents, with free transfers, and in the outlying zones at 5 cents. The system at Holyoke consists of more than 70 miles of track, operating about 180 passenger cars.

May Raise Cincinnati Fare.—The Cincinnati (Ohio) Traction Company has notified W. C. Culkins, city street railway director, of its intention to increase its fare 5 cents on Jan. 1, 1920. The present fare is 7 cents. Whether the increase will become effective depends upon Cincinnati bankers with whom the company is negotiating for a loan of \$6,277,000. If the loan is secured the increase will not be made, but if negotiations fail an increase is inevitable and further increases are probable. According to the franchise when the company's books show a deficit for two months an increase in the fare is permitted. Official announcement of this increase must be made on the fifteenth day of the month preceeding that on which the increase will go into effect.

Personal Mention

Expert Traction Adviser

John Bauer Appointed to This Position on Transit Matters by New York's Corporation Counsel

John Bauer, who has been Chief of the Division of Accounts of the Public Service Commission of New York, First District, since July 1, 1917, has been appointed expert adviser on transit matters in the office of the Corporation Counsel of New York City. It is understood that his work in this capacity will deal largely with the financial and accounting questions relating to any transit litigation and proposed settlements of the electric railway situation which may arise.

Mr. Bauer's experience with the Public Service Commission, where he had charge of the accounting and financial



JOHN BAUER

investigations in connection with rate cases, issues of stocks and bonds, rapid transit contracts and miscellaneous problems, will prove useful in this connection.

Mr. Bauer received his technical training in economics and finance at Yale University. In 1908 he went to Cornell University, where he served as instructor and then as assistant professor in economics, lecturing on general economics, corporation finance and accounting. In 1914, to get practical contact with public utility regulation, he obtained a leave of absence from Cornell University and temporarily joined the Public Service Commission, First District, in New York City. Here he worked particularly on the revision of the uniform system of accounts, and in addition did a variety of analytical work in connection with rate cases, capitalization cases, rapid transit contracts, etc.

In 1916 he resigned both from Cornell University and the Public Service Commission, to take charge at Prince-

ton University of the newly created department of accounting, corporation finance and public utilities. Later he returned to the Public Service Commission in the capacity already mentioned.

Mr. Bauer has written articles on valuation, fair returns, and commission control of public service corporations for the *ELECTRIC RAILWAY JOURNAL* and other technical periodicals.

L. O. Gordon has resigned as general manager of the Jackson Light & Traction Company, Jackson, Miss.

W. T. Waters, publicity agent of the Georgia Railway & Power Company, Atlanta, Ga., has resigned to enter the automobile sales business in Atlanta.

Albert Clabaugh has been appointed manager of the Jackson Light & Traction Company, Jackson, Miss. Mr. Clabaugh succeeds L. O. Gordon, resigned.

N. H. Holifield, for several years superintendent of the Laurel Light & Railway Company, Laurel, Miss., has resigned. Mr. Holifield will engage in farming at Jennings, La.

James H. Wilkerson, a member of the Public Utilities Commission of Illinois, has been named by Governor Lowden to be chairman of the commission. Mr. Wilkerson succeeds Thomas E. Dempcy, resigned.

W. C. Dunbar, comptroller of the Philadelphia (Pa.) Rapid Transit Company, has been elected vice president of the company in charge of accounting and finance. The office of comptroller has been discontinued.

Thomas E. Dempcy, chairman of the Public Utilities Commission of Illinois, has resigned. Mr. Dempcy has been ill from pneumonia for some time and has taken no active part in the work of the commission for several weeks.

Carl B. Johnson was recently appointed superintendent of transportation of the Monongahela Valley Traction Company, Fairmont, W. Va., to succeed O. L. Flowers, now superintendent of the freight department.

Lee T. Shannon, formerly superintendent of transportation of the Altoona Logan Valley Electric Railway, Altoona, Pa., has been appointed general manager and elected a director of the Johnstown (Pa.) Traction Company.

W. C. Cook, assistant superintendent of the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., recently met with an accident while engaged in service for his company which has necessitated the amputation of one of his legs.

G. A. Richardson, who has been transportation manager of the Phila-

delphia (Pa.) Rapid Transit Company since last April, has been elected vice-president of the company in charge of operations, the office of transportation manager having been abolished. Mr. Richardson will enter upon his new duties on Jan. 1. The office of vice-president in charge of operations is a newly created one, and will represent a considerable extension of Mr. Richardson's duties. Before becoming connected with the Philadelphia Rapid Transit Company, he was general superintendent of the Puget Sound Traction, Light & Power Company, Seattle, Wash. A biography and a portrait of Mr. Richardson were published in the *ELECTRIC RAILWAY JOURNAL* for April 12, 1919, page 762.

Obituary

Herbert L. Breneman, a director of the Cincinnati (Ohio) Street Railway, died at his home in Cincinnati on Sept. 21. Mr. Breneman was a retired capitalist. He had taken a prominent part in the business development of Cincinnati.

Julius C. Dew, for many years roadmaster of the East St. Louis & Suburban Railway, East St. Louis, Ill., died on Nov. 15 at the age of fifty-nine years. Mr. Dew had been ill for several weeks.

H. L. Gantt, consulting engineer and author on engineering topics, has died. Mr. Gantt was perhaps best known through his writings on industrial management, a field in which he had specialized since 1884. He was also the inventor of the continuous piler, used in textile factories.

Philip L. Saltonstall, officer and director of many electric railway and electric light companies, died at his home in Boston on Nov. 15. Mr. Saltonstall was born in Newton, Mass., May 4, 1867, was educated at St. Mark's School and Harvard University and soon after graduation from the latter institution became associated with the Thomson-Houston Electric Company, Lynn, Mass. He subsequently became active in the direction of electric railway and light companies, serving as a director of the Bay State Street Railway; president and a director of the Hartford & Springfield Street Railway; treasurer and a director of the Manchester Traction, Light & Power Company, and a trustee and a member of the executive committee of the Massachusetts Electric Companies. Mr. Saltonstall was one of the financiers who a number of years ago bought a group of electric railways and formed the Bay State Street Railway, now operated as the Eastern Massachusetts Street Railway. He took a keen interest in electric railway problems and was especially active in promoting civic welfare and community affairs.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,

SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

Electrical Sheet Mills Booked to June, 1920

Demand Is Heavy—March, 1919, Prices Prevail—Many Manufacturers Will Be Short of Stocks

Producers of electrical sheets are sold well through the second quarter of 1920. With one exception the old price of last March prevails, and the amount of this one advance is \$6 per ton. During the summer and early fall producers were booking for the end of 1919 and first quarter of 1920, at the price which should then prevail. At that time the steel strike was in the spring with an unknown result. Now it is generally felt that it will not be necessary to exact a premium on sheets because of a higher wage scale, and the former price is in general prevailing as late as first half of 1920 delivery.

The demand for electrical sheets is very heavy, and it is evident that electrical manufacturers throughout the country have full order books. Demands have been received for considerably more than available productive capacity, and consequently some electrical machinery manufacturers are going to go short on sheets. Some prominent producers of electrical apparatus are known to be in the market for additional electrical sheets. There is no reason to believe that these companies did not order sufficient material but rather that allotments to them were not sufficient to cover their excess needs along with the excess needs of virtually all manufacturers using electrical sheets. Sheet production has been higher than normal capacity in certain mills recently, and it is expected that in 1920 more capacity will be added.

This short market is going to work a hardship on many manufacturers who failed to take advantage of open books to order according to requirements for the first half of the new year. It is expected that some old customers are going to suffer in this connection as well as new customers. As present unfilled steel orders are greater than at any time this year, the prospect is not too bright for anything but over-capacity orders for 1920.

Electrical Manufacturers' Club Annual Meeting

One of the most successful meetings in the history of the Electrical Manufacturers' Club was held at Hot Springs, Va., on Nov. 19 to 22. Addresses were made at the meetings by W. G. Merritt and Dr. B. C. Tremaine. Le Roy Clark, president of the Safety

Insulated Wire & Cable Company, New York, was elected president for the ensuing year. The other officers elected were: Vice-president, Edward B. Hatch, Johns Pratt Company, Hartford, Conn.; secretary, F. L. Bishop, Hartford Faience Company, Hartford, Conn.; treasurer, Sears B. Condit, Condit Electrical Manufacturing Company, Boston; Commissioner, F. W. Sanford, General Electric Company, Harrison, N. J.

Reciprocating Track Grinders Advance

Further Increases Looked For—Limited Number of Machines Ready for December Delivery

Reciprocating track grinders are being built in large quantities for stock in order to make prompt deliveries during the first quarter, according to recent reports. A great many inquiries are being received and it is the belief of manufacturers that the amount of business which was booked during the next three months will show a 50 per cent increase over the fall months.

Prices have advanced from 10 to 20 per cent, but these have been expected for some time past. A further advance may be necessary later, depending upon additional wage increases and prices of forgings and castings.

Production has been and still is very slow at present. Difficulty in getting parts, castings, fittings and other numerous parts has been responsible for the slowing up of shop schedules and that, of course, has resulted in decrease of production.

Present stocks are exhausted, but a number of machines are almost finished and will be ready for late December delivery. From that time on, no trouble will be experienced from a lack of available machines.

Sales show healthy increases over the dull summer months. Buying is on a regular basis and approximately 50 per cent more machines are being contracted for now than during the summer season.

Railway companies are making reasonably prompt payments on what they do purchase although the amount contracted for does not compare favorably with that of previous years.

Conditions do not appear to be improving greatly, although it is believed that as soon as the benefit from the use of safety cars begins to be effective the revenue thus released by reduced operating expenses and by fare increases will put the railways in a better buying condition.

Coal Restrictions Removed Effective Dec. 16

Gradual Resumption of Service by Railways Which Were Compelled to Cut Schedules

Removal of coal restrictions were announced Dec. 16 by the central coal distributing committee. Former schedules for railroads and railways are rapidly being resumed and it is believed that within a few days full operation will be effected on all electric railway properties that were forced to reduce service.

In order to fill industrial demands, restrictions formerly in effect, which reduced the use of coal in the manufacture of coke by 25 per cent, also have been removed and the volume of coke production will soon be restored to normal.

Steam railroads in the Middle West and especially at Chicago are clearing their tracks of non-essential freight in order that the movement of coal may be facilitated. A general freight embargo may be brought about until all of the available coal stocks have been moved.

Production during the first week in December, taken from the latest Geological Survey figures available, was 43.5 per cent of normal and was thus lower than at any time since the first two weeks of the strike. Compared with the fourth week of the strike, when the wage negotiations were broken off, the tonnage per working day fell off 8 per cent. The total output for the week was 5,259,000 net tons while the average during the four weeks ended Oct. 25, which may be regarded as normal, was 12,089,000 tons.

Glass Expected to Increase 15 to 25 Per Cent

Factories Close for Season with Many Unfilled Orders—Bookings Refused Pending New Price Scale

Advice from the Pittsburgh district is to the effect that higher price schedules will be announced shortly and that until further notice, no new bookings for plate or window glass will be made. Big interests have not withdrawn entirely from the market, but as production is sold for three months, it is considered poor policy to quote on future business in the face of the coal shortage and the uncertainty of labor conditions.

Glass factories are closing for the last half of the 1919 season with a production record for the year of less than

70 per cent of normal. With many orders for the present season only partially filled, and production stopped until February, when the 1920 season begins, it appears that the demand for 1920 will be the greatest in the history of the window glass business.

Stocks of the popular sizes are clear out of the market. Furthermore, what little is held by either jobbers or manufacturers is very poor in assortment and far below normal in quantity. Ruling prices have advanced 15 to 25 per cent on practically all grades, excepting window glass, on which an advance is expected to be announced at any time.

Window glass heavier than double strength is completely out of the market except for a very small amount held by jobbers. The disappearance of this grade is due to the pronounced shortage in plate glass and the substitution of window glass for the plate.

Rolling Stock

Michigan Railway, Jackson, Mich., is rebuilding a number of cars for safety car operation.

Chicago (Ill.) Surface Lines has been notified by the Public Utility Commission that it must purchase 200 additional cars.

Boston (Mass.) Elevated Railway placed an order with the Russell Car & Snow Plow Company for two snow sweepers.

Worcester (Mass.) Consolidated Street Railway has placed an order with the Osgood-Bradley Car Company for ten safety cars.

Androscoggin & Kennebec Railway, Bath, Me., has placed an order for twelve safety cars with the Wason Manufacturing Company.

Long Island Railroad, New York, N. Y., is in the market for fifty motor cars, thirty trailers and twenty steam coaches similar to those now in operation.

Birmingham Railway, Light & Power Company, Birmingham, Ala., expects delivery soon on the first of the twenty-five safety cars recently ordered from the Cincinnati Car Company.

Brooklyn (N. Y.) Rapid Transit Company, through its receiver L. M. Garrison, has applied to the Federal Court for permission to issue receivers' certificates for the purchase of thirty-seven new cars for the Nassau Electric Railroad and four cars for the Brooklyn, Queens County & Suburban Railroad.

Hershey Cuban Railway, Havana, Cuba, has recently placed an order for ten closed motor passenger cars, three combination passenger and baggage cars, two combination baggage and mail cars and one freight car. The passenger cars are to be of the semi-steel interurban type and will be 47 ft. overall. The contract was awarded to the J. G. Brill Company, Philadelphia, Pennsylvania.

Franchises

Huntington (N. Y.) Railroad. — A franchise has been granted by the town of Babylon to Joseph G. Robin, representing New York interests, to operate a trolley line in the town of Babylon over the Huntington-Amityville route of the defunct Huntington Railroad.

Track and Roadway

British Columbia Electric Railway, Vancouver, B. C.—Decision has recently been made by the British Columbia Electric Railway to build about a mile of new track beyond the Shaughnessy Heights tract to connect the car lines on King Edward and Wilson Avenues. The Wilson Avenue line was never finished or put in operation so the new work will mean entirely new overhead construction for about 1½ miles and the addition of that much track to the mileage under operation. This extension of service carries out an agreement of several years' standing between the company and the Canadian Pacific Railway. The latter owns the land being opened up by the new line and has postponed its development until the present time. This will be the first new track this electric railway has opened for operation since 1913.

Power Houses, Shops and Buildings

Miami (Fla.) Traction Company.—A power house and some rolling stock belonging to the Miami Traction Company was destroyed by fire on Oct. 30 last.

Louisville & Interurban Railroad, Louisville, Ky.—The power house of the Louisville & Interurban Railroad at Lyndon, Ky., 9 miles from Louisville, was destroyed by fire on Nov. 11. The plant was valued at \$75,000.

Toronto - Pickering Hydro - Radial Railway, Toronto, Ont.—The Ontario Hydro-Electric Power Commission has prepared plans for the Toronto terminal of the proposed Toronto-Pickering Radial Railway. The cost of executing the plans is estimated at \$4,328,665.

Rolling Stock

Eclipse Valve Grinder Company, Kansas City, Mo., is now quartered in the Terminal Railway Building.

United Electric Construction Company, Inc., Cleveland, Ohio, contracting electrical engineers, has opened an office at 558-559 Hippodrome Annex.

George F. Simons, who recently was district manager for the Detroit and Cleveland offices of the Edison Storage Battery, has resigned to enter the industrial truck field.

Allis-Chalmers Manufacturing Company, Milwaukee, Wis., announces the appointment of Frank O'Ryan as district manager of its Denver office.

R. D. Nuttall Company, Pittsburgh, Pa., announces that R. R. Gartside has been appointed manager of the railway and mining sales division of the company.

Owensboro Ditcher & Grader Company, New York, N. Y., announces that its New York office has moved from Room 222 to 832 Singer Building, at 145 Broadway.

Richardson-Phenix Company, Milwaukee, Wis., lubrication engineer, has reopened its Philadelphia offices in the Bailey Building under the management of George F. Fenno.

Poole Engineering & Machine Company, Baltimore, Md., on Oct. 1 opened a branch office in Boston in the Old South Building, in charge of Robert W. Catlin, assistant manager.

R-P-R Company, Chicago, Ill., sales engineer, handling power-plant equipment, has been organized with Barrett Rogers as manager. The headquarters of this company are at 364 Monadnock Building.

Fairbanks, Morse & Company, Chicago, Ill., will start the erection in Beloit, Ill., next year of a large foundry, to be 900 ft. x 500 ft., containing 495,000 sq.ft. of floor space. It will have a capacity of 350 to 400 tons of gray iron per day and will employ 3000 men.

Bound Brook Oil-less Bearing Company, Bound Brook, N. J., has completed an addition 100 ft. x 180 ft., a new two-story office building 100 ft. x 40 ft. and a new power plant. The new buildings adjoin the foundry, thus giving closer co-operation between all departments.

H. C. Hancock, who has represented the Trumbull Electric Manufacturing Company at its Chicago branch for several years in the Middle West States, has severed his connection to become industrial engineer with the Great Lakes Electric Company of Detroit.

Inquiry No. 31,380.—An Austrian railway company desires to purchase monthly about 30 tons of copper needed in locomotive productions, especially such copper as is used in making bars, plates, and tubes. Offers should be accompanied with an analysis of the copper.

United Import Company, West Toronto, Ontario, Can., has moved to new premises at 69 Adelaide Street, East Toronto. The company represents the Pittsburgh Electric Specialties Company, Pittsburgh, Pa., and the Weiss Biheller, Ltd., London, England. James Fleck is manager.

Burk Electric Company, Erie, Pa., announces that it has purchased the good will and all records, patterns and drawings, special tools and equipment of the C. & C. Electric & Manufacturing Company and is prepared to fill orders for spare parts, duplicate machines, welding and other supplies.

Franklin W. Gilman, production engineer with the Sanford-Riley Stoker Company, Worcester, Mass., and of the Murphy Iron Works of Detroit, Mich., sailed recently for Japan where he will remain for about a year in connection with the installation and operation of stokers manufactured by the two companies.

Domestic Engineering Company, Dayton, Ohio, has been acquired by the General Motors Corporation, according to an announcement recently made by W. C. Durant. The Delco company will be merged with the General Motors Corporation and hereafter operated as a branch under the present management.

Dickey Steel Company, Inc., New York, N. Y., announces its appointment as Eastern sales and export representative of the Hammond Steel Company, Inc., Syracuse, N. Y., manufacturers of high-speed, alloy and straight-carbon tool steels, and a complete line of alloy steels in bars, weldless rings, die blocks and special shapes.

Chester A. Gauss, until recently advertising manager of the Crocker-Wheeler Company, Ampere, N. J., has resigned his position with the company to become a partner in the newly formed firm of Robertson, Gauss & Company, engineering sales and advertising counselors, with temporary offices at 59-61 Pearl Street, New York.

George C. Wing, Cleveland, Ohio, writes that patent No. 965,972 issued to him and Frederick W. Hempey, in his opinion, covers the use in a street car of seats between transverse hand rests, the seats being arranged so that they will fold up and thus give greater standing room in the car. An Italian car of this type was described in No. 20 issue of this paper, page 909.

Roller-Smith Company, New York, N. Y., announces that its California representative, the Electric Material Company, 589 Howard Street, San Francisco, which handles Roller-Smith measuring instruments, watt-hour meters and circuit breakers in California, Nevada and parts of Oregon and Idaho, has opened a Los Angeles office in the Title Insurance Building under the management of E. H. Bell.

Black & Decker Manufacturing Company announces the removal of its general offices from 105 South Calvert Street, Baltimore, Md., to Towson Heights, Baltimore, where a new building, 100 ft. x 200 ft. is being added to the plant. Additional machine-tool equipment will be installed in the new extension which increases the company's floor space 20,000 sq.ft.

M. H. Dinshaw & Company, Bombay, India, large importers of all kinds of machinery including motors, dynamos, and miscellaneous equipment, advise that they will be pleased to receive catalogs, price lists with discount sheets and any other information in regard to these lines. Dinshaw & Company stand ready to represent any reliable manufacturer and can furnish satisfactory references in America.

Imports into Australia.—A proclamation has been issued prohibiting the importation without a license into Australia of steel car wheels and axles for electric railways and electric railway material such as rails, fish plates, bolts, tie plates, switches, crossings, intersections, etc. It is stated that this procedure will greatly interfere with British exports and will militate against the development of Imperial trade and business.

Van Dorn & Dutton, Cleveland, Ohio, announce that E. W. Sinran, who has been general manager for several years, was elected president of the company at a meeting of the board of directors held recently. Mr. Sinran is president of the American Gear Manufacturers' Association. Franklin Schneider was elected vice president. He is also president of the Van Dorn Electric Tool Company. Mr. Sinran is treasurer of the latter company.

Kelvin Engineering Company, Inc., New York, N. Y., has organized a new department to do general engineering and contracting work in this country and in Latin America. This department will be in charge of Carlos Lobo, formerly borough engineer, Department of Water Supply, Gas & Electricity, Brooklyn, N. Y. The company is now prepared to execute contracts for furnishing and erecting electrical and industrial machinery and equipment.

Zobell Electric Motor Corporation, Garwood, N. J., which was incorporated last April and capitalized at \$250,000, will manufacture both alternating-current and direct-current motors having somewhat similar characteristics and established sizes ranging from 1 hp. to 7½ hp. The present equipment is designed for an output of from 200 to 300 motors per month. Fred G. Bell is president, A. T. Zoebisch treasurer and F. E. Bucker secretary and superintendent of the plant.

Mechanical Appliance Company, Milwaukee, Wis., maker of Watson electric motors, with factory and main offices at Milwaukee, has recently opened new offices in Buffalo and St. Louis. W. C. Winterroth, formerly connected with the Chicago office, will be at 318 Prudential Building, Buffalo, as district sales manager for western New York. The St. Louis office will be in charge of L. F. Mahler, who has been recently appointed district sales agent for St. Louis and adjacent territory. His office is at 1039 Syndicate Trust Building.

B. F. Goodrich Company, Akron, Ohio, announce the appointment of Major C. G. Carothers, who recently returned from France after two years' service in the U. S. Army, as Chicago railroad representative of the company with headquarters in Akron, Ohio. After serving a machinist's apprenticeship in the Big Four shops at Mattoon, Ill., Major Carothers attended Purdue University and was graduated as a railway mechanical engineer in 1912. For several years he was mechanical engineer for a railroad equipment manufacturer

and in 1914 became senior mechanical engineer with the Interstate Commerce Commission, Valuation Department, Southern District, with headquarters at Chattanooga, Tenn. He became a captain of engineers in July, 1917, and arrived in France early in January, 1918. He was made master mechanic and later became superintendent of motor power of the 13th Grand Division, Transportation Corps, with headquarters at Is-sur-Tille, France.

New Advertising Literature

Hubbard & Company, Pittsburgh, Pa.: Folder in the new Pierce presteeled pin.

Harvey, Hubbell, Inc., Bridgeport, Conn.: Mailing folder showing various types of lamp guards.

Penn Electrical & Manufacturing Company, Irwin, Pa.: Bulletin P-20 on panel boards and cabinets.

U. S. Electrical Manufacturing Company, Los Angeles, Cal.: Bulletin No. 105 on its electric motors.

Goulds Manufacturing Company, Seneca Falls, N. Y.: Bulletin No. 122 on centrifugal pump sales service data.

Allis-Chalmers Manufacturing Company, Milwaukee, Wis.: Bulletin 1532 on Diesel type oil engines.

Cutler-Hammer Manufacturing Company, Milwaukee, Wis.: Folder on its new swivel attachment plug.

L. J. Wing Manufacturing Company, 352 West Thirteenth Street, New York, N. Y.: Bulletin No. 58 on "Scruplex" electric ventilating fans and exhausters.

Westinghouse, Church, Kerr & Company, New York, N. Y.: A folder showing some of the shops the company has built.

Betson Plastic Fire Brick Company, Rome, N. Y.: A folder on one-piece permanent baffles for water tube boilers.

High Speed Hammer Company, Rochester, N. Y.: A folder on high speed, ball bearing, motor-driven, bench drill presses.

Block & Decker, Baltimore, Md.: Catalog on electric air compressors, portable electric drills and electric valve grinders.

Gurney Ball Bearing Company, Jamestown, N. Y.: Engineering bulletin giving uses of ball bearing in machine design.

Shaw Insulator Company, Newark, N. J.: Bulletin A-16 covering its moulded insulation and lightning protective equipment.

Bacharach Industrial Instrument Company, Pittsburgh, Pa.: Leaflet on Pitot tubes and orifices for measuring the flow of gases in connection with flow meters.

Ohio Brass Company, Mansfield, Ohio: Illustrated catalog on Imperial incandescent headlights for electric traction and mining service, numbered 205 and dated Nov. 1, 1919.



When Cramped for Space Use

PEACOCK STAFFLESS BRAKES

On some of the new one man Safety cars and also on some of the old heavies, the vestibule where the motorman stands is cramped for space and he hardly has room to do his regular duties to say nothing of letting on and off passengers.

The Peacock Staffless Brake has been designed to meet just this condition. It is compact and sets out only $3\frac{1}{4}$ inches in the car vestibule.

Like all other Peacock brakes it is strong, quick and positive.

The best proof of its ability is to see the hundreds that are now used all over the country.

Why not get in touch with us and let us show you how much safer your cars would be if they were equipped with Peacocks?

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Bankers and Engineers

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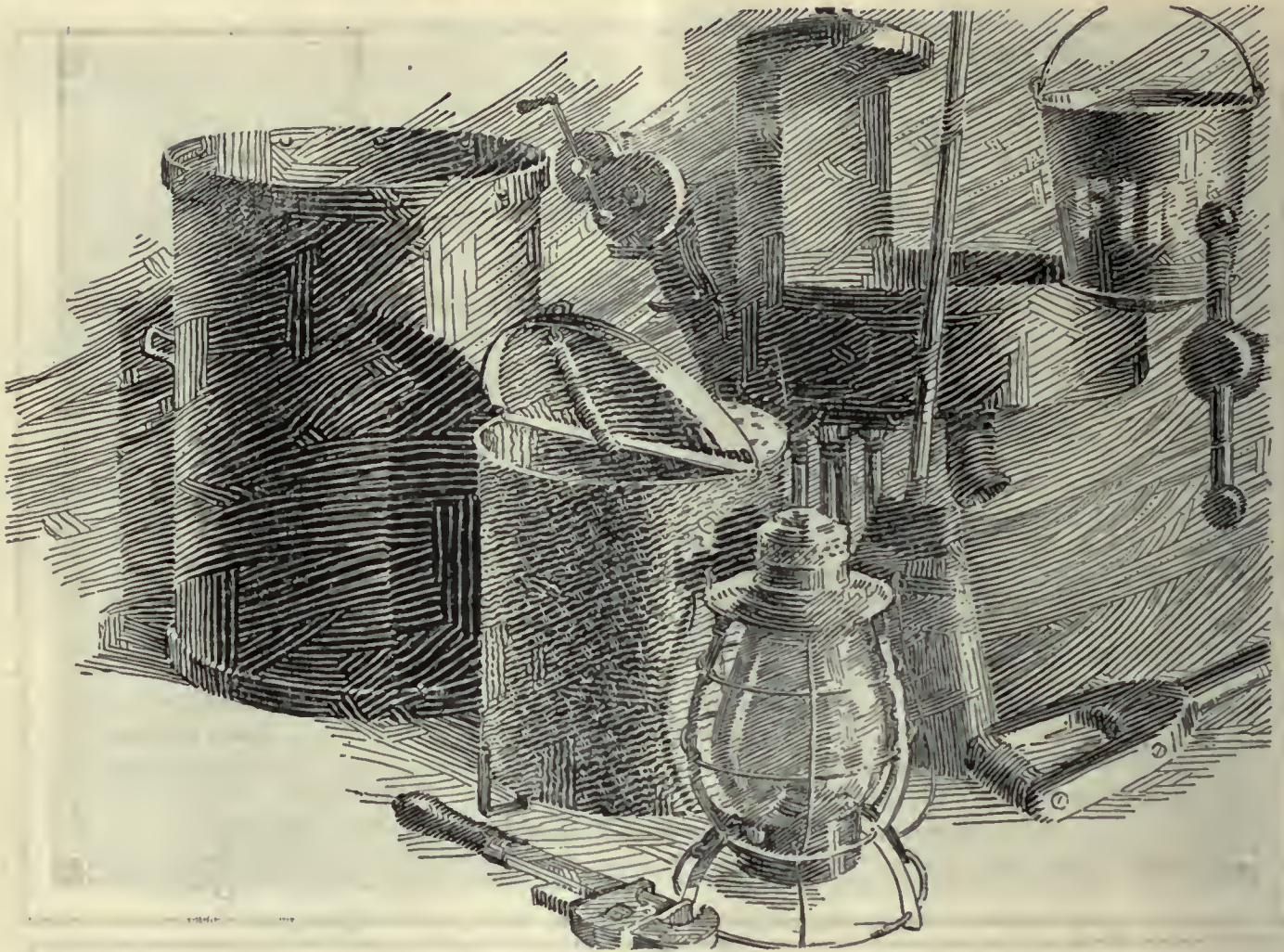
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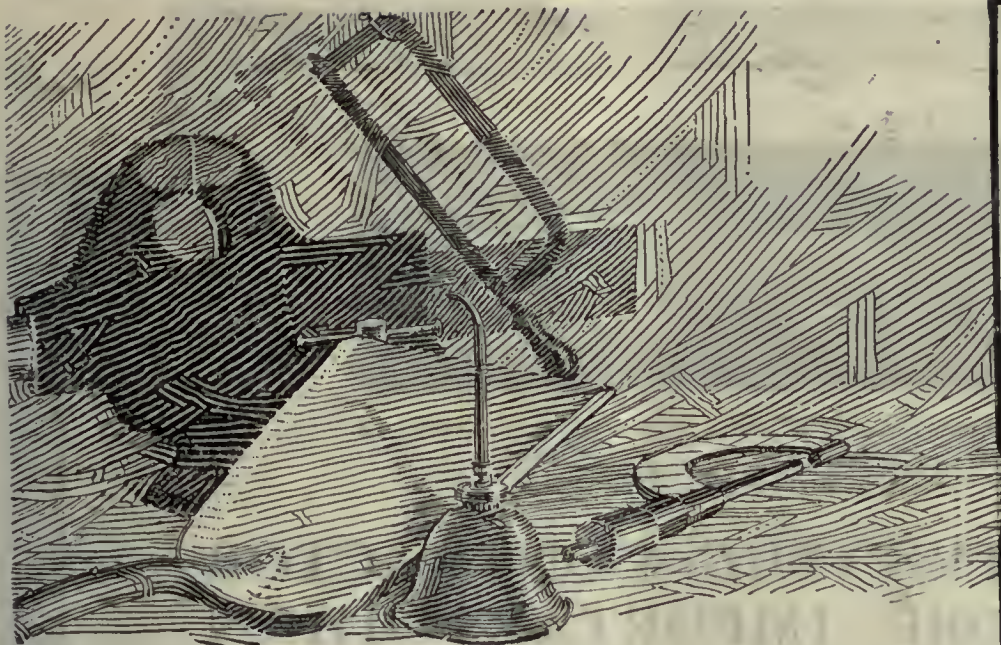
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All that we ask is a conference.

The contract will take care of itself.

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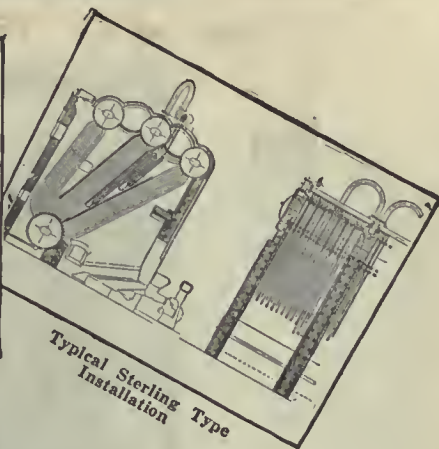
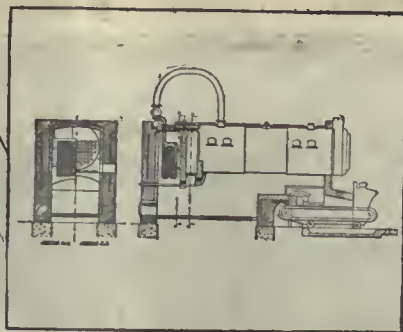
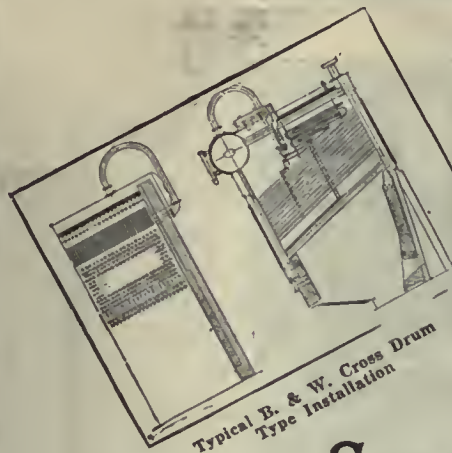
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It won't cost you a cent. Lay the print out and you can see at a glance how simple it is to install the Elesco Superheater in your boiler.

The Elesco requires no changes to your boiler settings.

It may be applied to any size or type boiler.

Troublesome gaskets and hand holes are eliminated by the metal to metal ball joint be-

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Outline your plant conditions on the attached coupon. Send it today, so you may have the blueprint promptly.

You can save from 5 to 15% in fuel cost when you install the Elesco.

Your plant will benefit by superheating it. Let us prove it to you.

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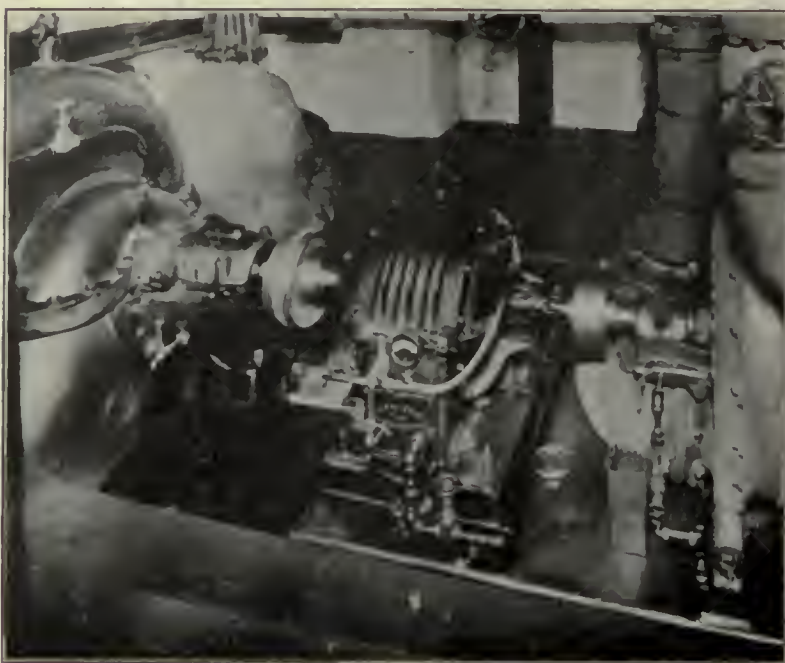
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Please send me a Blueprint of the Elesco Superheater installed in the following type boiler:

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*Another
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The Auxiliary Drive for Traction Power Stations

IN THIS instance the 125 H.P. Turbo Gear is transmitting the power from a Curtis Steam Turbine to a Wheeler condenser pump, with a reduction of 6 to 1.

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Besides economy of upkeep, its freedom from wear and tear on bearings—there is no side strain—its perfect forced lubrication and its high efficiency of 98% plus, make it the unusually economical gear for this purpose. Will you let our engineers consult with you on your problems? We have a bulletin for you.

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Another Satisfied User

One Turbo Pump set was installed in 1910, three more followed in 1911 and two more in 1913 at the Lehigh Valley Transit Company's plant at Allentown, Pa.

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But when, after eight years, such an efficient plant as the above is satisfied with the operation of



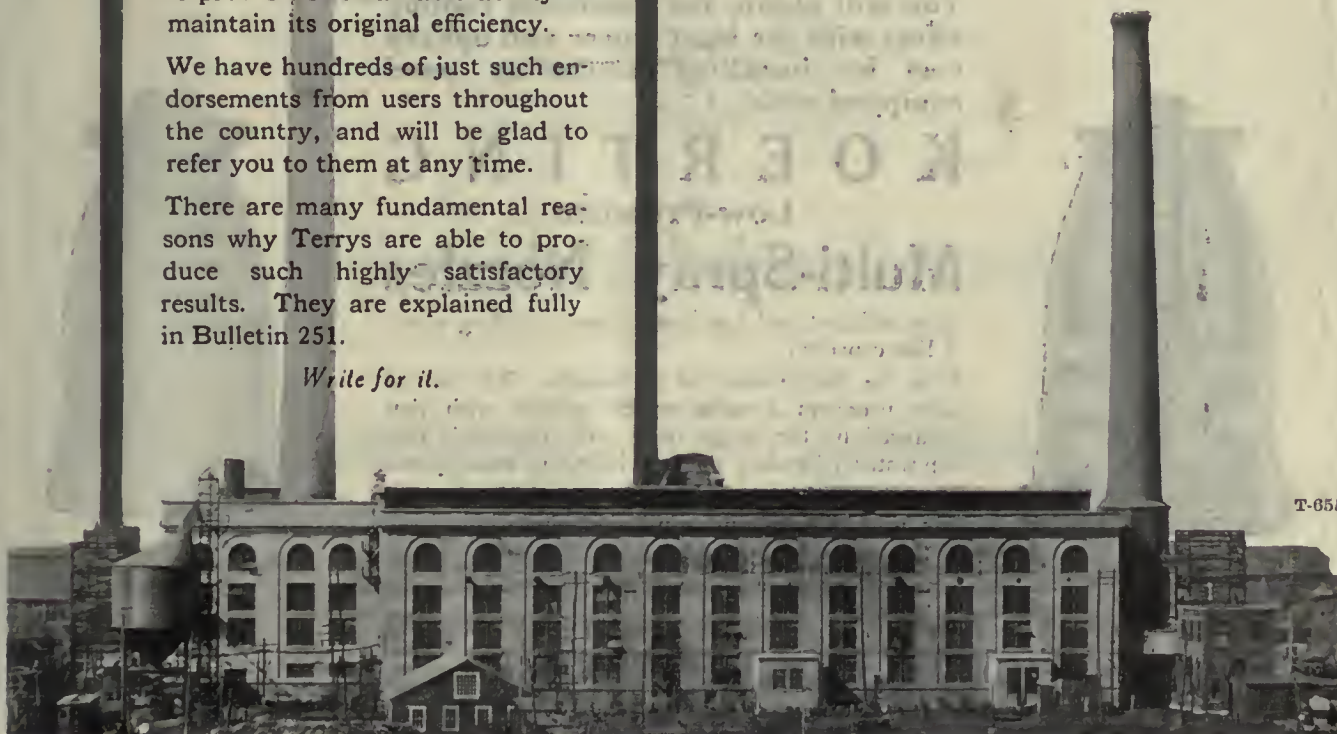
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it proves its remarkable ability to maintain its original efficiency.

We have hundreds of just such endorsements from users throughout the country, and will be glad to refer you to them at any time.

There are many fundamental reasons why Terrys are able to produce such highly satisfactory results. They are explained fully in Bulletin 251.

Write for it.



T-655



The Terry Steam Turbine Co.
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Re-cool Your Condenser Water at the Lowest Cost—



Painesville Municipal Light Plant, where Koerting Multi-Spray Nozzles replaced a cooling tower

You will obtain the maximum cooling effect with the least power and upkeep cost by installing a cooling pond equipped with

KOERTING Low-Pressure Multi-Spray Nozzles

More efficient and less costly than a cooling tower of like capacity.

Note the double effect of the nozzle. The central helix produces a spray which collides with that produced by the larger helix with the result that the water is broken up into infinitely small parts.

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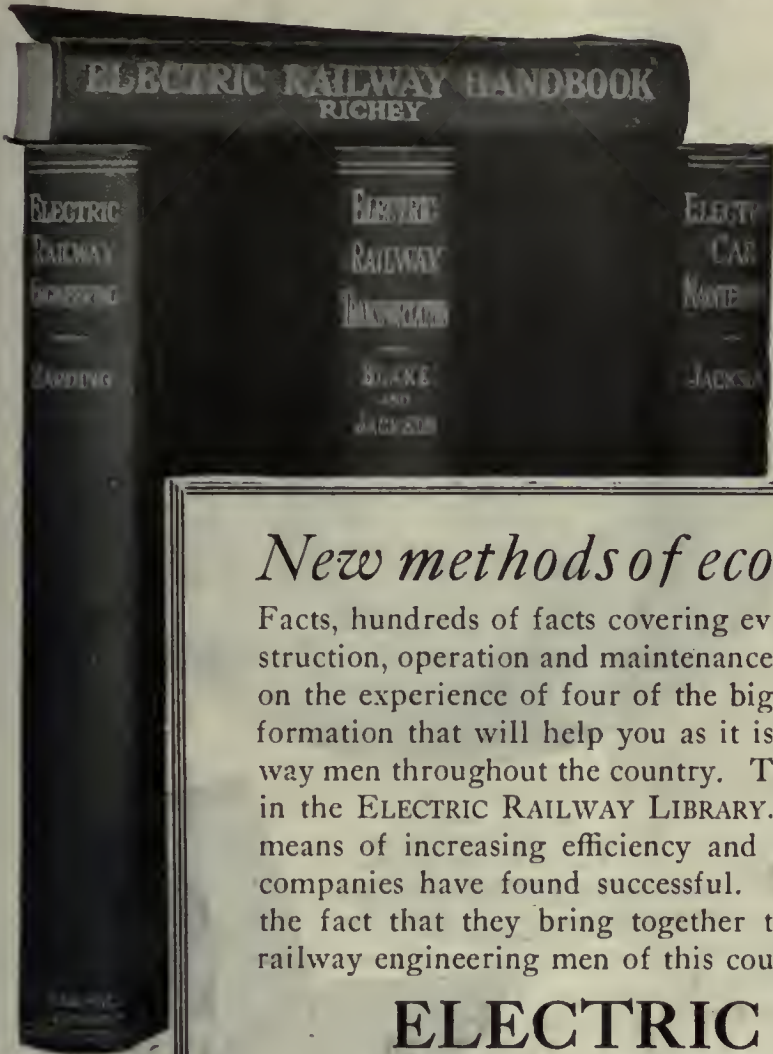
the problems of the Electric Railway demand the *best* methods—the *best* equipment—in order to keep pace with the rush of reconstruction. Toledo Cranes furnish the answer in their particular field of handling—a field which is the *basic factor* in Electric Railway economies. There is a Toledo that will meet your requirements. Investigate.

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Naples
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"See Naples and die" was the old motto.

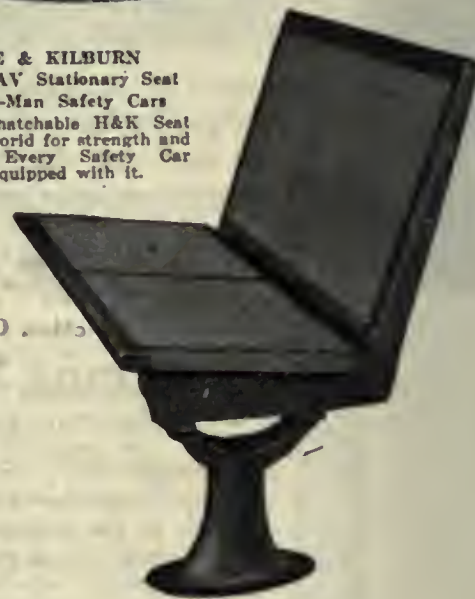
For us it reads: "See Naples, from Hale & Kilburn seats, and enjoy."

Riding is good in Naples, for that long slope up from the crescent-shaped bay isn't conducive to walking in the many warm months.

Perhaps "any old seat" would have been good enough in such circumstances, but the Neapolitan Tramways was out to sell transportation—

Which accounts for its choice of Hale and Kilburn seating.

HALE & KILBURN
No. 108/AV Stationary Seat
For One-Man Safety Cars
This unmatched H&K Seat
beats the world for strength and
lightness. Every Safety Car
should be equipped with it.



Use Hale and Kilburn Seats
For Maximum Revenue and Maximum Wear



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Ninety Million Dollars in Fares Absolutely Safeguarded

WE take pride in pointing to the following list of electric railway properties which, during the past year, have been completely equipped with JOHNSON REGISTERING FARE BOXES. Their combined revenue from passengers at the present rate will exceed \$90,000,000.

All these companies, after thorough tests, have added to their equipment until at the present time our fare boxes are installed on all lines operating in city service.

Many of them are also using our METAL TICKETS, so that a visible registration will account for every class of fare in use on the system. While our fare boxes are used on a total of more than 150 railway properties, the following companies are listed as the most recent instances of complete installation:

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Twin City Rapid Transit Company
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Denver Tramways Company
Capital Traction Company
Washington Railway & Electric Company
Seattle Municipal Railway
Omaha & Council Bluffs Street Railway Company
Michigan Railway Company (City Lines)
Terre Haute, Indianapolis & Eastern Traction Company
(Terre Haute Div.)
Memphis Street Railway Company

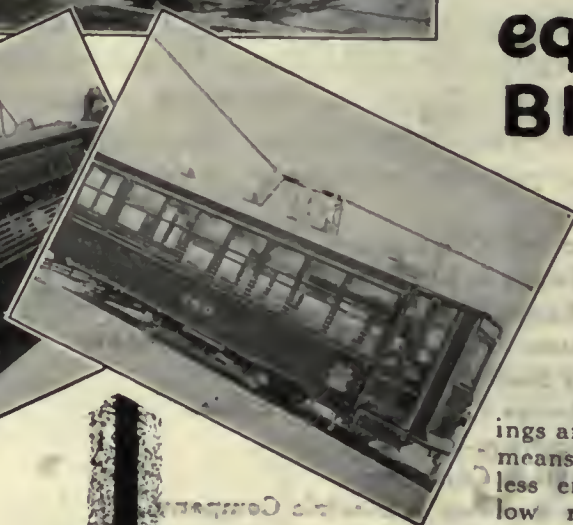
We know of no stronger approval of our registering fare boxes than that indicated by complete installation after a thorough test.

We take pleasure in referring to any of the above companies for further information.

Johnson Fare Box Company

Chicago

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A few GURNEY equipped BIRNEYS

—only few of the hundreds now operating in many cities all over the country. Their main journals are Gurney equipped.

To these wonderful little cars Gurney Bearings are a necessity. Their use means maximum car mileage, less energy consumption and low maintenance—the very advantages for which light-

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Let us explain in detail why Gurney Bearings were chosen as standard equipment by many of the largest safety car builders.

Gurney Ball Bearing Co.

Conrad Patent Licensee

Jamestown, N. Y.

GURNEY

"Barreras de Seguridad" en Cuba

meaning

"Barriers of Safety" in Cuba



H-B LIFE GUARDS

The United States is not the only country that uses H-B Life Guards. Other countries all over the world are adopting H-B Life Guards as the standard "Barriers of Safety."

Here is Cuba for instance. Only a small tropical country, but the Cubans have an equal regard for human life. Therefore they choose H-B Life Guards as the best life-and-limb protection in front end accidents.

"Barriers of Safety" Between the Fallen Pedestrian and the Car Wheels

THE CONSOLIDATED CAR FENDER COMPANY

PROVIDENCE, R. I.

General Sales Agent **WENDELL & MACDUFFIE CO.** 61 Broadway, N. Y.

While the Nation Sleeps the Railway Operator's income can be increased

Because the number of passengers hauled at night is small and the sleeping populace objects to the noise of rolling stock operation, need not make it impossible for you to have a very material income from night operation.

True, passengers will not get up out of bed to ride on quietly running, helical gear-equipped cars, but neither will they get up to shout imprecations at a train of practically noiseless cars hauling freight through the city.

Helical gears do not make rolling stock operation absolutely noiseless—you can still hear the hum of the motors and the click of the wheels passing over the rail joints, but the noise of the gears is eliminated.

R. D. Nuttall Co.
Pittsburgh, Pa.



Nuttall Helical Gears

A PROVEN SUCCESS



The QUALITY MARK



The Quality Mark

The Tool Steel Gear & Pinion Co.
Cincinnati, Ohio



Booth of Columbia Machine Works & Malleable Iron Co.
at A. E. R. A. Convention, Atlantic City

Announcing a change in the sales organization

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Mr. J. L. Whittaker, whose office is located at No. 141 Milk Street, Boston, Mass., will handle the New England territory.

Mr. Ernest Keller, is taking care of the State of Pennsylvania, District of Columbia, Maryland, Virginia, West Virginia, and including part of New York State.

The territory in and around New York

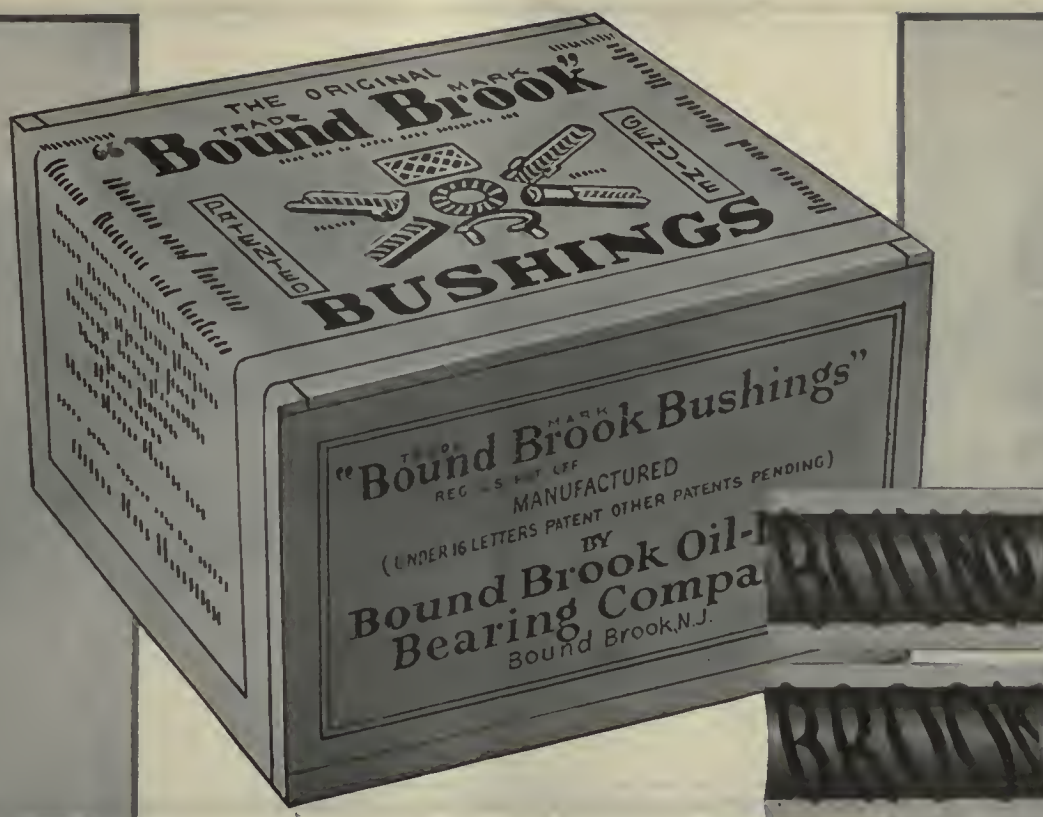
City, also including part of New York State is being handled by Mr. Frank Hedley.

Mr. S. A. Reading has been appointed our representative for Brazil, with headquarters at Rio de Janeiro.

We wish to take this opportunity to thank our many friends and customers, and with the help of our present representatives will as in the past continue to give your wants our most careful and prompt attention.

All communications should be addressed direct to factory office where they will be given immediate consideration.

Columbia Machine Works & Malleable Iron Co.
Atlantic Ave. and Chestnut St., Brooklyn, N. Y.



Longer Trolley Wheel Mileage

Not even the best trolley wheel can function properly for any length of time if equipped with a poor bushing—and that means any type of plain bushing.

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Bound Brook (Oil-less) Trolley Wheel Bushings require less attention. It is seldom that a Bound Brook Bushing fails to outlast the wheel itself. *When it's time to replace a Bound Brook, it's time to replace the wheel.*

The record of Bound Brook Oil-less Bushings—in service on over 60% of the country's electric systems—shows that they outlast by a wide margin all other bushings of whatever make.

All Genuine Graphited Oil-less Bushings have always been made at Bound Brook, U. S. A.

Bound Brook Oil-less Bearing Company

Specialists in the manufacture of Oil-less Bushings for more than a third of a century.

Bound Brook, New Jersey

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It's Springy

That is why Users of **Franklin Perfection** Journal Box Packing get such long life out of it.

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Franklin Perfection Journal Box Packing has solved the Hot Box problem on numerous Electric Railways and if given a chance it will go a long way toward relieving your road of the expense.

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This ribbon is
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Employment of the V-K Non-Arcing Harp prevents all arcing due to loose fitting axle-pins because it is equipped with a patented gripping device, which eliminates destructive wear, improves current flow and lengthens the life of both trolley wheel and harpequipment. Send for illustrated Catalog.

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M-C Lubricated
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Number 22-1



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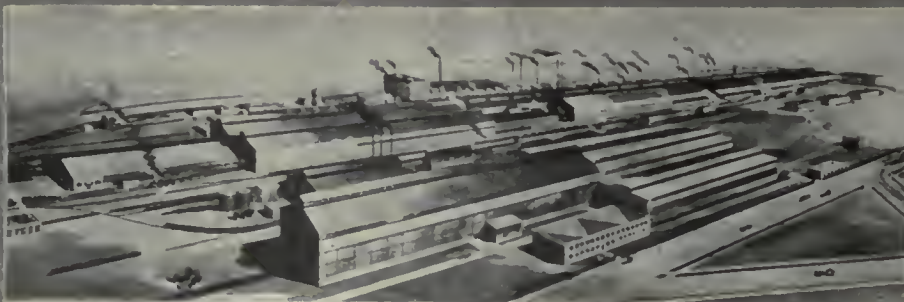
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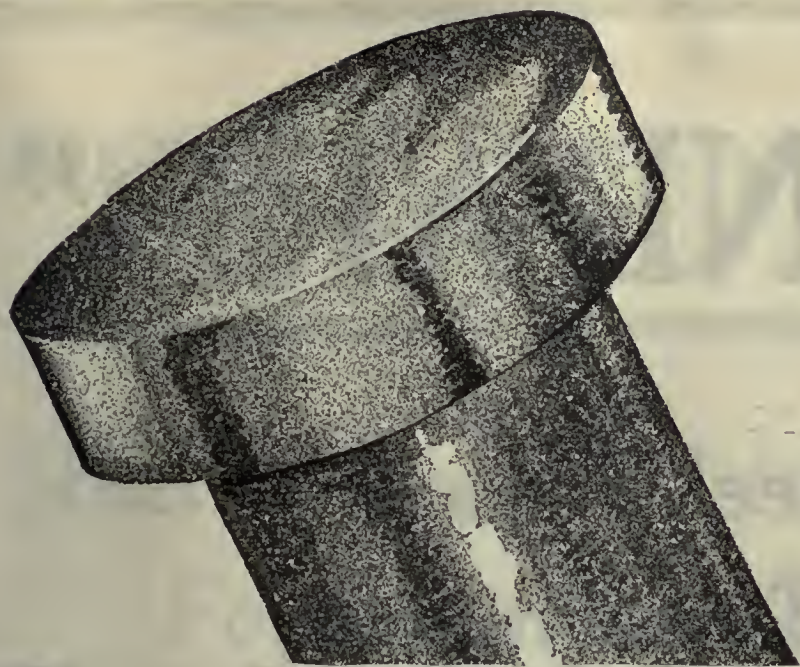
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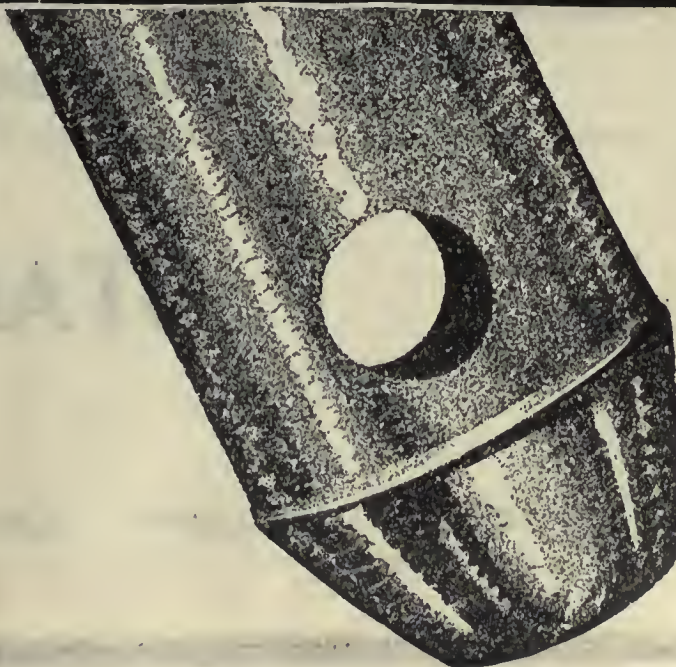
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Safety Cars are Safer when **BOYERIZED** Brake Pins are Used

When your brakes are held together by a brake pin that will not break and shows practically no wear after 200,000 miles use, your Safety cars become Safer.

This is what the Boyerized Case Hardened Brake Pin will do. Let us send you samples so you can see for yourself.



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St Louis Car Company

St Louis Mo.



Suspend your lines with
ANDERSON
 Round top straight line
SUSPENSION

This suspension is made with drop forged steel studs with ear outriggers turned up or down. Aetna Insulation, of course. Just what you need for your Lines.

Aetna
Insulation and Line Material

Aetna Insulation has been on the market for nearly 30 years. Many attempts have been made to excel it, but all have failed and Aetna after all these years stands in a class by itself. The Aetna line material has been foremost in the Electric Railway field for many years. Electric Railways all over the world find its strength, insulating quality, durability under long exposure.

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MASSEY

**HOLLOW-REINFORCED
 CONCRETE**

POLES

The trim effect of Massey Concrete Poles, as contrasted with those of wood is not only a decided asset in the appearance of a city street, as the illustration shows—but is attained at a *positive saving*.

Not being subject to electrolysis, corrosion, or in any way deteriorated in appearance by the weather—they do not require painting or other maintenance expense, and have the permanence and beauty that is typical of concrete.

The special centrifugal process of manufacture insures the proper placement of the reinforcement and a uniformly dense concrete, while their hollow construction means lightness and ease of handling.

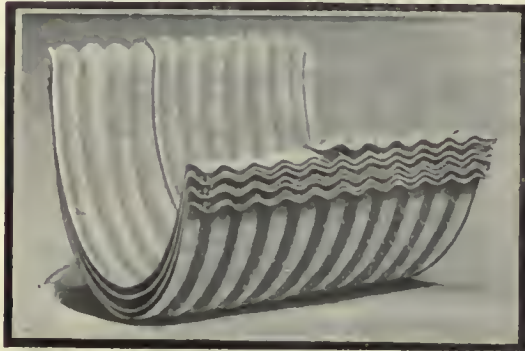
They are easily adaptable to all the usual forms of trolley supports.



Massey Concrete Products Corp.
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You'll Have No "Hauling or Installing" Troubles If You Buy "ACMES"



Hauling and installing full circle corrugated culverts is no small item, especially if the culverts are large.

Your troubles begin at the freight house. If there isn't any hoisting machinery handy, you have to hire a gang of men to load the culverts on the wagons.

As for hauling—you must have long coupled wagons. And not many culverts can be hauled at one time.



Eliminate such troubles. They come in 2-ft. upper and lower sections. These sections are nested into bundles. See illustration.

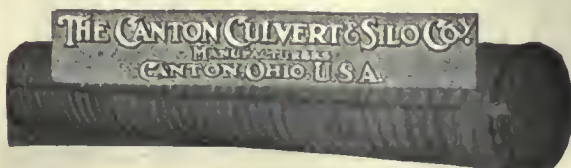
Only two men are needed to load or unload any size of "ACMES." And what's more, you don't need long coupled wagons for hauling them. Since they come in sections you can haul them in an ordinary farm wagon or a small truck.

Full circle culverts are often damaged when they are rolled into place. This doesn't happen with "ACMES" because they are set up *right in the ditch*. Two men can install any size.

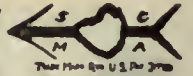
Sometimes culverts can be shipped to a station within a very short distance of the work. Then the item of hauling is not so great, and if you desire, we ship the "ACMES" already set up.

Remember! "ACMES" are made from "No-Co-Ro"—that famous pure iron. Year after year they resist rust.

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"THE WOOD ETERNAL"

is its **high resistance to decay**. (Specify "All-heart Tidewater Cypress"—every piece identified by the above trade-mark as the product of a responsible *Licensed Assn. Mill*.)

The Railway Signal Association has always placed all-heart Cypress among the first choices in the list of suitable woods for

Trunking and Capping

The Railway Signal Association makes its recommendations as a result of definite **knowledge**, and its membership includes many able men who are Cypress enthusiasts. We gladly refer any doubter as to Cypress superiority to any well posted engineer who has had experience with "The Wood Eternal."

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WALK along the track some day and note the rail joints that keep free from snow or, if it is a damp day, note the joints that keep dry. The fireman down at the power house is taking care of such joints, keeping them warm.

You can stop such a drain on your coal pile by sending the bonding crew out.



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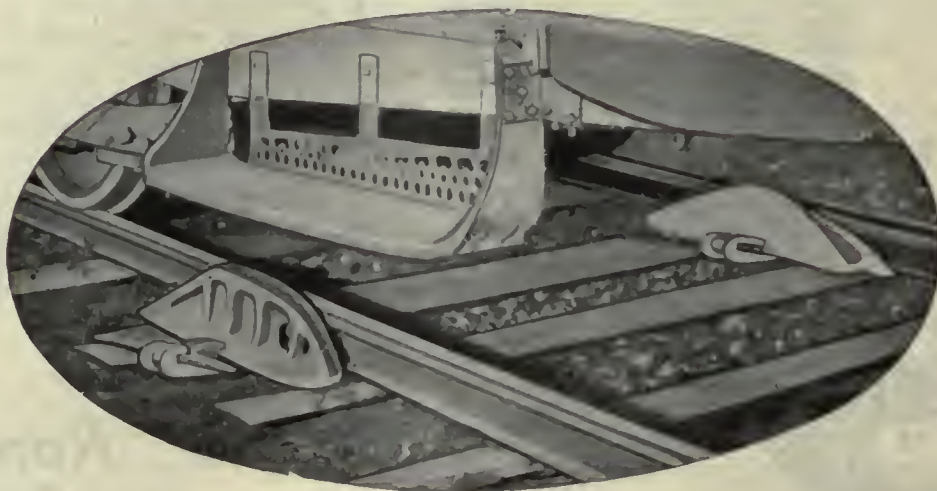
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NO SPIKING REQUIRED—CLAMPS HOLD REPLACER



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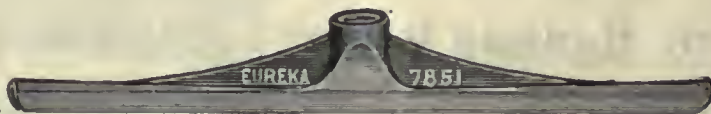


Eureka

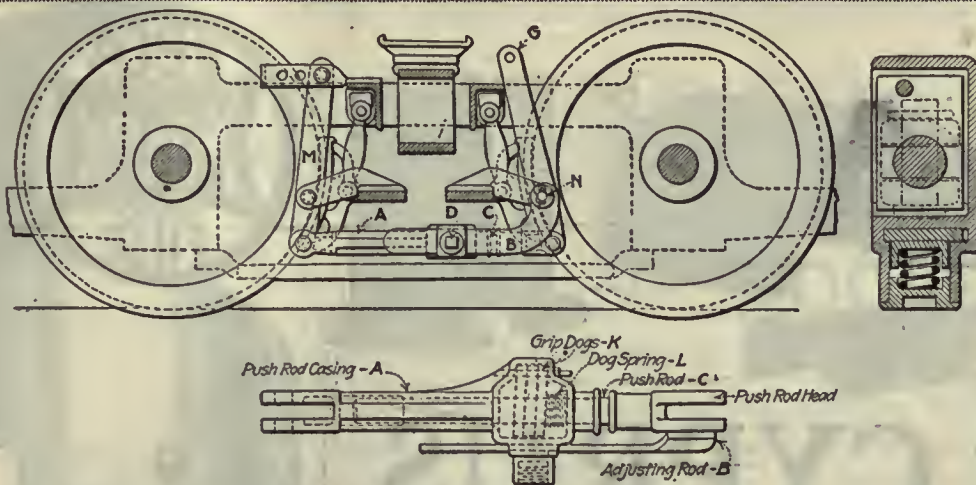
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Operates with every application of the brake. Continuous adjustment resulting in 100 per cent. efficiency in braking power at all times.

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Eliminates manual adjustment; increases brake shoe mileage; less power consumption. When your cars are equipped with **Gould Slack Adjusters** you are assured safety and reliability in brake equipment.

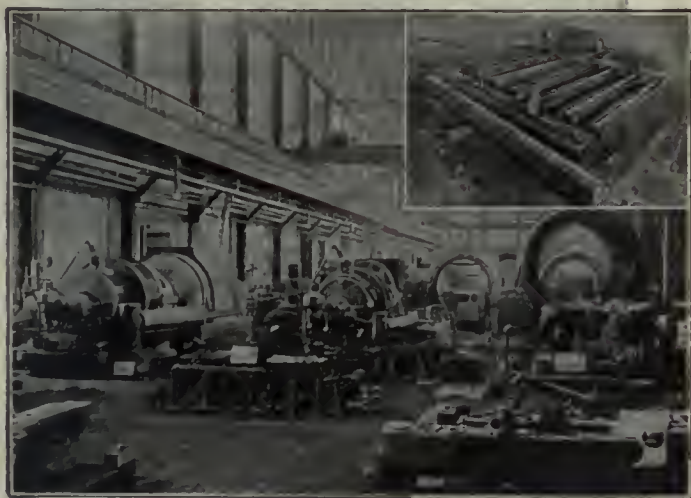
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The operating economy and reliability of Allis-Chalmers Products are the direct outcome of years of experience in manufacturing machinery that has made good in every land under varying operating conditions. The general excellence of Allis-Chalmers Products insures high grade workmanship and reliable operation.

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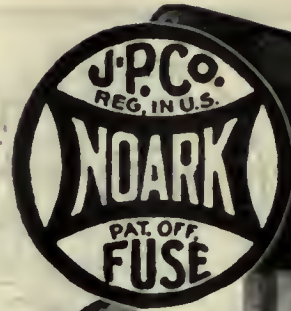
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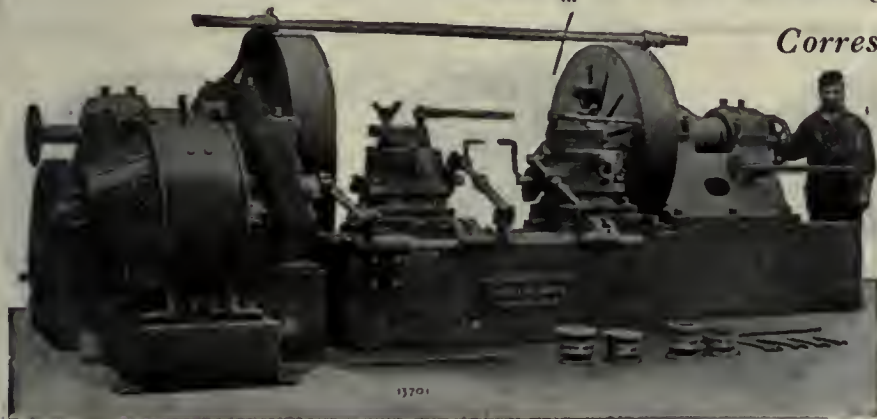
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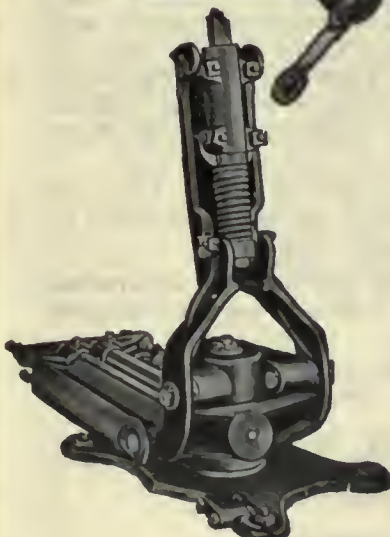
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Harp or wheel changed in ten seconds, or a pole in less than a minute. No tools—only your hands. All lubricating, adjusting and repairing done at the work bench. No delays to car schedules. That is why

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It is not only a great time saver, but it is unsurpassed for efficiency and economy. Try it for 60 days. You must be satisfied or the equipment is ours. Get ready for heavy traffic.

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Reversible Controller Fingers

they are fitted permanently. The finger never wears out and the tip, besides being reversible, gives twice as much wear on each side as the ordinary finger. When worn on both sides, simply snap on another tip without removing the finger from the controller. Cars are kept on the street, service maintained, and time, labor and money saved.

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This is all you scrap
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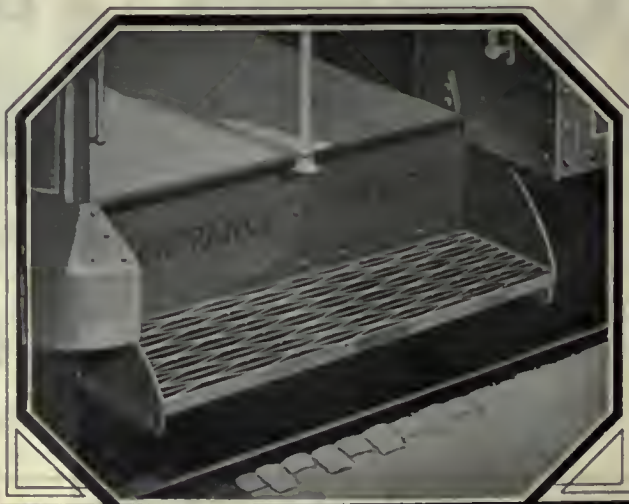
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ABSOLUTELY NON-SLIPPING ALWAYS



Think of an absolutely non-slipping car step—a step that nothing can make slippery—not even snow or ice or rain or grease, or long wear. Well that's the kind of a car step the Irving "Safstep" is. Its narrow steel members, set edge on, grip the foot unfailingly—even when worn smooth and shiny. And—being made of steel throughout—it is as wear-proof and time-proof as a car step can be made.

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Safety Cars —*

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The Edwards Sash Lock has become a standard fixture on the Birney Safety Car. It is one of the points which help to secure safety.

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Positively Locks

It is safe at all times.

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Sash Lock with phantom view
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*Motor and Generator Brushes
to meet every service condition*

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Bates Steel Poles are becoming universally popular world wide. Repeat orders testify their general suitability for every Pole purpose.

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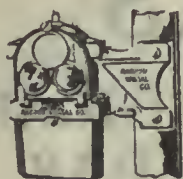
Highest class and most up-to-date steel pole equipment in the world.

Our STEEL POLE TREATISE tells the story. Ask for it.

About 2,000 tons of steel constantly on hand; hence prompt shipments.

Tubular Steel Poles cost 50 per cent. more than Bates Steel Poles, yet Bates Poles are 100 per cent. stronger—will last 100 per cent. longer, cover a much broader range of adaptability and are much more artistic than Tubular Poles. Ask us to certify these facts.

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on that piece of
single track that's
been worrying you

will show when the block is clear, tell the motorman when he has set the stop signal at the other end, show to following cars that the block is occupied, and give each an indication that it is protected in entering; meanwhile holding stop signals against opposing movements until the block is clear again.

Nachod signals save time, they never sleep, and are ever on the alert to prevent accidents.

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Means Uninterrupted Operation

The NEVER-CREEP anchor represents a mighty advance in the reinforcement of poles.

It pulls only against solid, undisturbed ground—that's why it cannot climb nor creep, nor lessen its strength or holding power from the moment of its installation until it is removed intentionally.

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The Name
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that they are **SAFE!**

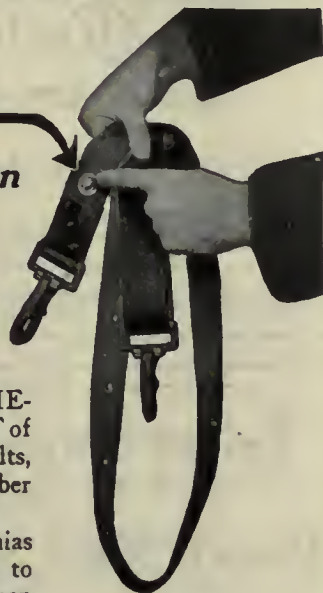
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The top section is reinforced by the intermediate section. The 3-section design makes it possible to raise the platform 16 inches higher and drop it 12 inches lower than can be done with the old-style 2-section tower

We'll gladly send you details.

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They prevent creeping moisture and quickly drain the petticoat in wet weather, keeping the inner area dry.

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FEEDER CIRCUIT

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this fall to solve their joint troubles and increase the life of their rails.

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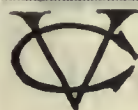
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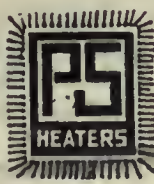
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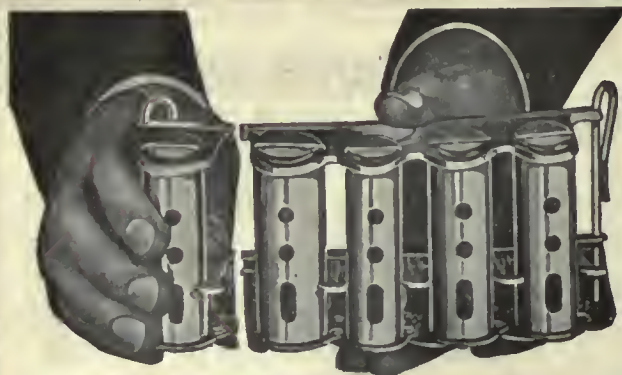
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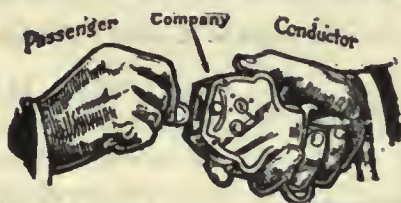


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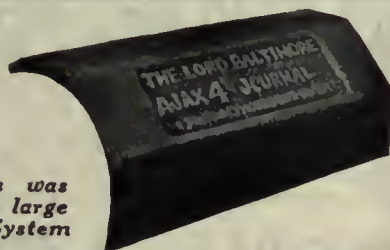
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PW-533—Electric Railway Journal
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STANWOOD STEPS—Self-cleaning, non-slippery, light.

Our products used on all leading railroads, on cars and stations. For details address:

American Mason Safety Tread Co.,
Lowell, Mass.

Branch Offices: Boston, New York City, Philadelphia.
Agencies in all principal cities.

OXWELDING Reduces Maintenance Costs

OPERATING expense is stubborn—hard to keep down nowadays.

But maintenance costs, on street railways everywhere, are yielding to the Oxweld Blow-pipe.

Oxwelding puts worn and broken parts back in service, improves and cheapens rail bonding, remodels old style rolling stock, builds up worn rail joints.

Send for bulletin Series 700 and you'll quickly understand why Oxweld is described as

"The One Man Machine Shop"

Complete outfits for smallest to the largest shops.

OXWELD ACETYLENE CO.

Newark, N. J.

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World's largest maker of Equipment for Oxwelding and Cutting Metals



*For
Immediate
Shipment*



Ready for Operation

Two (2)

Type "A" War Board Cars

Mounted on Brill 77-E Trucks



CONSTRUCTED according to design recommended by War Board Committee to meet unusual transportation problems created by the war. Suited to one-man operation between peak periods if desired. Embodies light weight and safety equipment features of popular Birney Safety Cars and also adapted to center-entrance or front-entrance, center-exit operation.

Have over-all length, 47 ft. 9 in.; over-all width, 8 ft. 2½ in.; and seating capacity, when operated by two men, 57 and, when operated by one man, 61. Truck wheel base, 5 ft. 4 in.; wheel diameter, 26 in.; wheel tread width, 2½ in. Fully described in Oct. 26, 1918, issue of Electric Railway Journal.

Have never been in operation, and will be painted to meet requirements of purchaser.

THE J. G. BRILL COMPANY
Philadelphia, Pa.



AMERICAN CAR CO., St. Louis, Mo.
G. C. KUHLMAN CAR CO., Cleveland, Ohio.
WASON MANFG. CO., Springfield, Mass.





You are Paying for Birney Safety Cars, Anyway

How?—The average city car is constructed to handle its maximum passenger load, and outside of peak periods the cost of operation is greater than its revenue. To produce necessary power to operate the usually heavy city car it requires more fuel than is consumed in maintaining the more modern Birney Safety Car Service.

BIRNEY SAFETY CARS REDUCE POWER CONSUMPTION

and, consequently, the ever too-high coal bill takes a tumble.

Birney Safety Cars form a profitable investment. They not only earn money by saving it in operating and maintenance expense, but also the improved service they render attracts short walkers and increases net earnings.



Excess fuel consumed in operating the average city cars is actually money

Birney Safety Cars will stop this boiler room waste

THE J. G. BRILL COMPANY

Philadelphia, Pa.

AMERICAN CAR CO., St. Louis, Mo.
G. C. KUHLMAN CAR CO., Cleveland, Ohio.
WASON MANFG. CO., Springfield, Mass.



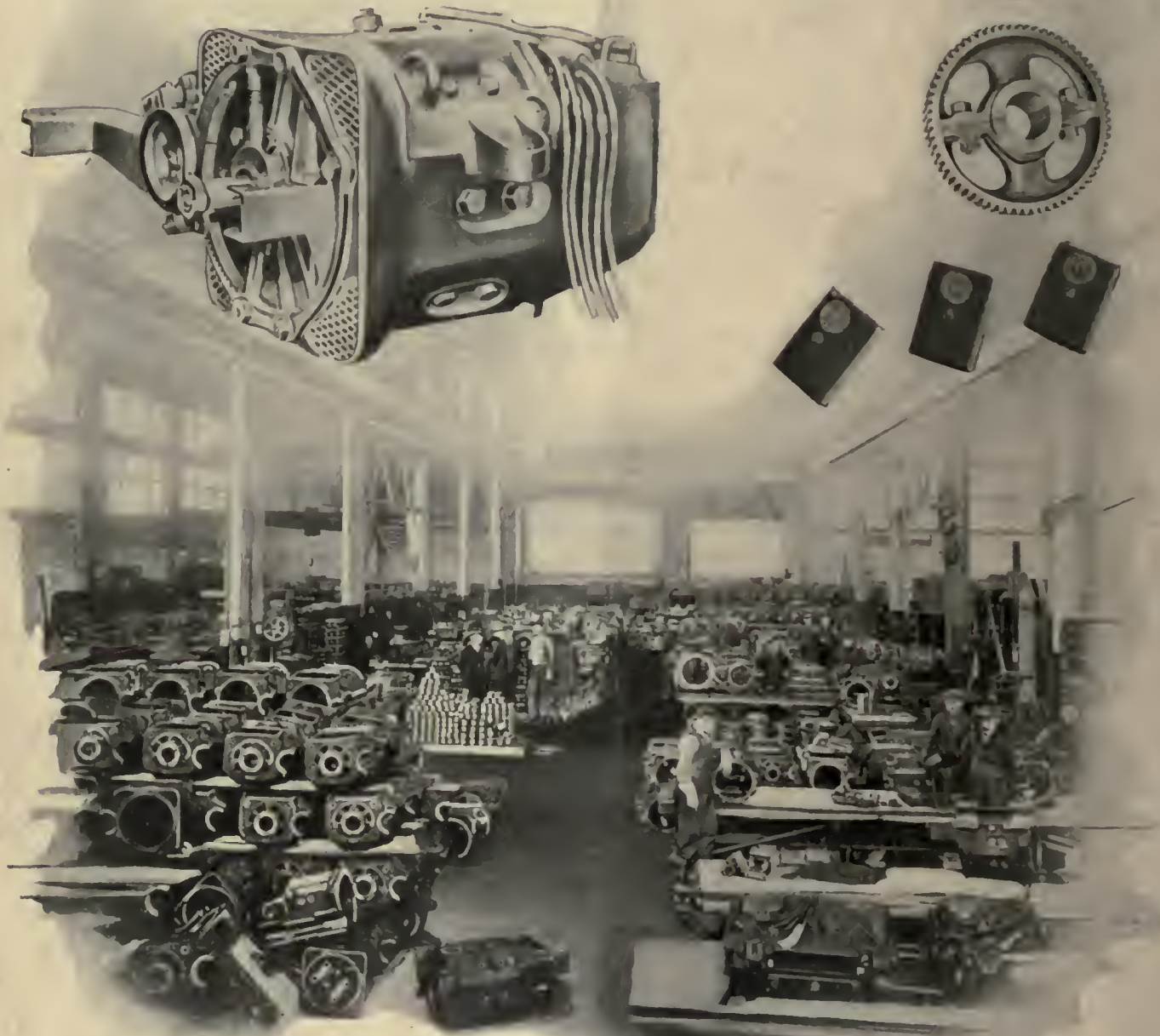
The Lightweight Motor for Severe Service

Rapid and economical city transportation demands a motor of high continuous capacity—suitable for small diameter wheels, light in weight, strong, reliable, and with a low cost of maintenance.

The G-E 258 motor is

“just that” and has proved by years of service the right to these claims.

The G-E Grade M Gear that is being used in mesh with the 258 motor, like G-E Carbon Brushes, will sell themselves to those who know them.



Railway Motor Assembly Department

25-64

General  **Electric**
Company

General Office
Schenectady, N.Y.

Sales Offices in
all large cities

ELECTRIC RAILWAY JOURNAL

McGraw-Hill Company, Inc.

December 27, 1919

Fifteen Cents Per Copy



Removing the Brake

Friction is the relentless enemy of efficient operation. In the average mill it destroys at least 25 per cent. of all the power produced or bought.

Yet this tremendous waste can be largely reduced—in fact, has been reduced to a minimum in hundreds of plants of every description through the aid of S K F Bearing Engineers.

These practical engineers, backed by the fund of knowledge constantly available in the S K F Research Laboratories, render an invaluable service. They remove the brake that slows down production by solving perplexing and costly friction problems.

*Manufacturers are invited to avail themselves
of this bearing service at any time*

S K F INDUSTRIES INCORPORATED

Sales, Service and Research Division
165 Broadway, New York

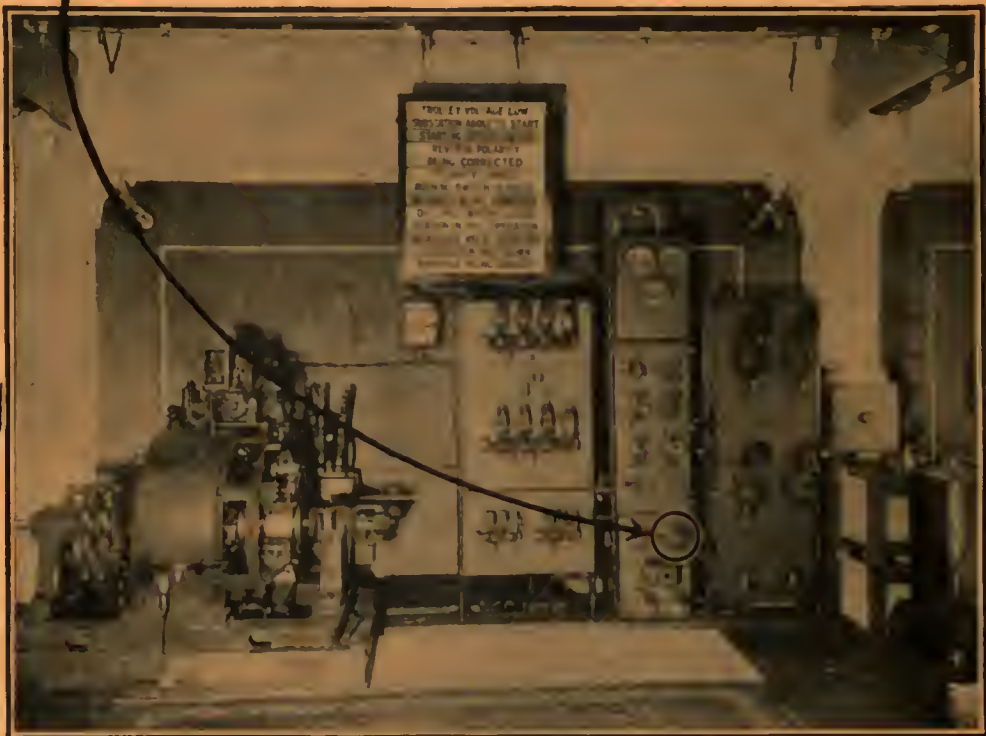
570

SKF INDUSTRIES

SKF Ball Bearings
Hess-Bright Ball Bearings
Atlas Steel Balls
Gronkvist Chucks
Transmission
Hangers



The Reverse Phase and Low Voltage Relay protects the machine from transposition of line connections, low voltage of all phases, and from failure of any phase.



The relay constitutes one of the most important of the many protective devices embodied in the Westinghouse Automatic Substation.—It is a standard induction relay which is used extensively by most of the large operating companies.

Write for Descriptive Leaflet No. 3998-A

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.



Westinghouse

Electric Railway Journal

H. W. BLAKE, *Editor*

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The Future of the Air Brake

*"Sail on, O ship of State!
Sail on . . . strong and great!
With all the hope of future years."*

What of the Future? Our strong conviction is that it holds opportunity for brake developments equally as great as those of the past. Electrification of steam railways will bring new braking problems. These and others we are amply prepared to meet because of exceptional facilities made possible by our long experience and large staff of air brake experts in laboratory, shop and field.

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Our study of air brake problems never ceases. We solve a problem in the "plus" fashion, that is, we more than solve it. We solve through the present problem, beyond and into the next one, and thus keep a lap in advance of current requirements.

*"Future's veil we cannot lift,
Beyond it we cannot see,
So let the experience of the past
A guide to our Future be."*

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The short headway, high speeds, also short stops and quick get-aways of elevated and subway rapid transit trains demand the use of the highest type of an air brake combining the efficiencies and refinements of the WESTINGHOUSE Electro - Pneumatic, Variable Load type. Send for Descriptive Catalogue T2018.



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Type EL-1 Trolley Ear

Light
Strong
Durable

Will Not
Creep Along
The Wire

Does Not
Obstruct The
Passage of The
Trolley Wheel



Type EL-1 Trolley Ear

Made By
The Green
Sand Core
Method

Carried
In Stock.
Prompt
Delivery.

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WESTINGHOUSE
ELECTRIC

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

Westinghouse

You Wouldn't Suppose That Safety Cars Could Operate on Narrow Granby Street, Norfolk, But They Do!



EVERY day brings a new proof of the adaptability of the genuine Safety Car with quick braking and emergency control features.

Now it's operation in Norfolk, Va., which has a collection of old-fashioned, narrow streets that are decidedly out-of-date in this hustling, bustling port. And worst of all is Granby Street where 'most everybody goes to do his or her shopping. Why an auto standing alongside the Granby St. curb actually overlaps the car tracks!

But just the same, the Safety speed-up equipment now installed in Norfolk on the Atlantic City, East Mainland Brableton line of the Virginia Railway & Power Company is getting the people down to Granby Street every 7 instead of every 10 minutes and—

A 20 per cent increase in the patronage is a mighty strong proof that the public of Norfolk likes the SAFETY CAR.

THERE is but one way to give *your* public the same satisfying service at a notable reduction in your present operating costs. It is to use for either new or re-built cars the Safety Equipment of this company.

It is a Safety Car Only—

when equipped with automatic laborless apparatus, so interlocked, that regardless of the illness or distraction of the operator, the power will be cut off instantaneously, the airbrakes and sander applied immediately thereafter and the doors unlatch for safe and easy exit. Furthermore, it is a Safety Car only when the doors must be closed and the step folded before the car can start, and when the airbrake must be applied before the doors are opened and the step lowered in bringing the car to a service stop.

SAFETY CAR DEVICES CO.

Main Office—Boatmen's Bank Bldg.
ST. LOUIS, MO.

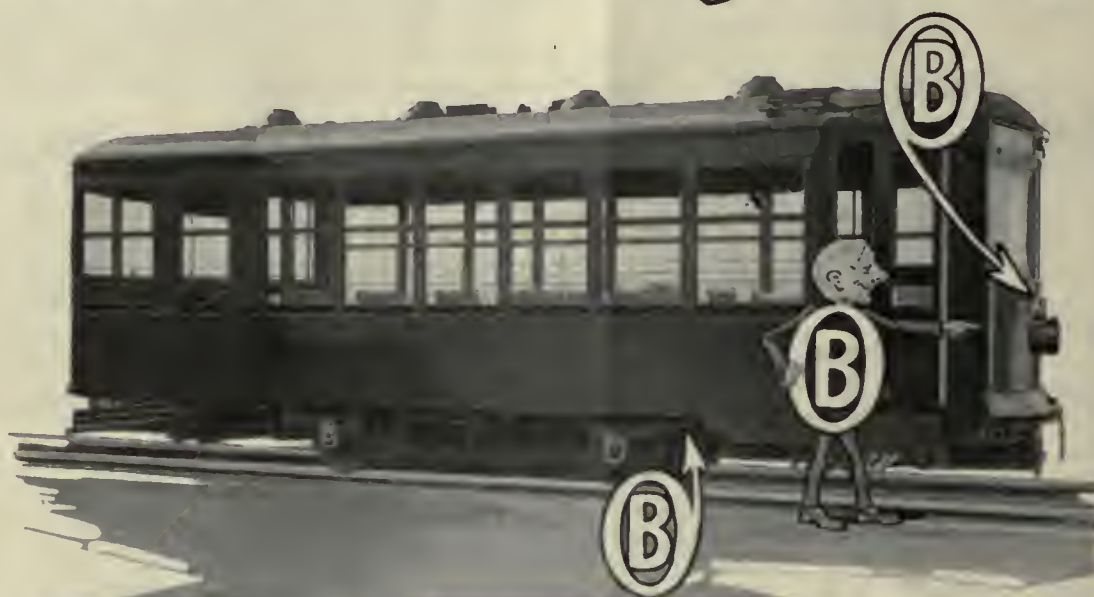
CHICAGO
Railway Exchange Building

NEW YORK
City Invest. Building

PITTSBURGH
Westinghouse Building

CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.

One Man Safety Cars Successful In Big Cities Too



PHILADELPHIA RAPID TRANSIT is using One-Man Safety Cars. These compact money-makers have their place in big cities as well as small. With them it is often possible to transform losing ventures into profitable lines.

These new Philadelphia cars are equipped with O-B Catchers, O-B Sand Traps and Crouse-Hinds Headlights. The Philadelphia Rapid Transit knows from experience what those devices can do.

The Ohio Brass Company
Mansfield, Ohio

New York
Pittsburgh

Los Angeles
Philadelphia

Chicago
San Francisco

Exclusive Sales Agents in the U. S. for Crouse-Hinds Imperial Headlights.





PRODUCTS

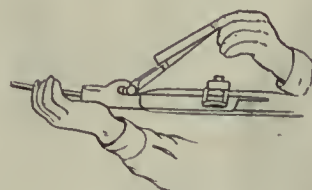
Quality First



O-B Type E Frog, adapted for high-speed service and for use where several types of cars are operated over same line.—Patented.



O-B Type D Frog, suitable for moderate speeds and all general city service.—Patented.



Slip tip under hooks—

Watch an O-B Trolley Frog go on the line

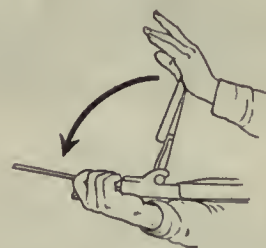
If you never watched an O-B Frog go on the trolley you can't appreciate its superiority.

The trolley wires are gripped securely by a single central clamp. Then the cam tips go on (see illustration). That's all.

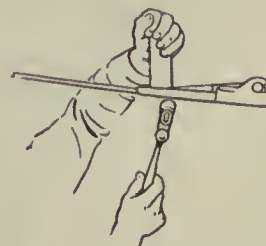
That simple, rapid installation means minimum traffic delay; it means there are no operations to be slighted or left out.

Then to speed, labor saving and thoroughness add long life. The sturdy O-B Frog is protected by O-B Sherardizing. The tough bronze tips which take the arc and wheel pound are renewable.

Order a trial lot of O-B Frogs. They cost no more than old style types.



turn over and down on the wire—



clinch the tips and the job is done.

The Ohio Brass Company, Mansfield, Ohio

New York

Philadelphia

Pittsburgh

Chicago

Los Angeles

San Francisco

Phono-Electric

City or Interurban Cars in Dallas



The weight of car, the tension of the trolley base and the amount of current required does not phase Phono-Electric Trolley Wire. It is so strong, tough, ductile and capable of withstanding high temperatures that its superiority for big interurban cars is as manifest as for city cars.

Realizing this the Dallas Railway has installed No. 00 Phono-Electric Trolley Wire for the Jefferson Avenue line over which interurban cars enter Dallas.

And the Dallas decision is all the more interesting because the business district of Dallas has been Phono-Electric for years.

Bridgeport Brass Company
Bridgeport Connecticut

What Is Your Cost of
Maintaining Crossings?
INTERNATIONAL
STEEL CROSSING FOUNDATIONS
Cut This Item 75 Per Cent

DID you ever analyze your maintenance charges per crossing per year? Do you realize that this item averages approximately \$125 per year per crossing frog? Quite a sum of money to be spending on these short sections of your roadway, isn't it? International Steel Crossing Foundations will cut this expense 75 per cent; prolong the life of your frogs and furnish for all time perfectly balanced riding.

C-10

The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

General Sales Office and Works: Cleveland, Ohio

Put These Bearings on Old Cars to Reduce Flange and Rail Wear

The wisest mechanical men are reducing wheel flange wear under their old cars, decreasing pull-ins for worn flanges, saving labor cost, and giving their way departments a chance to save too, by equipping present rolling stock with

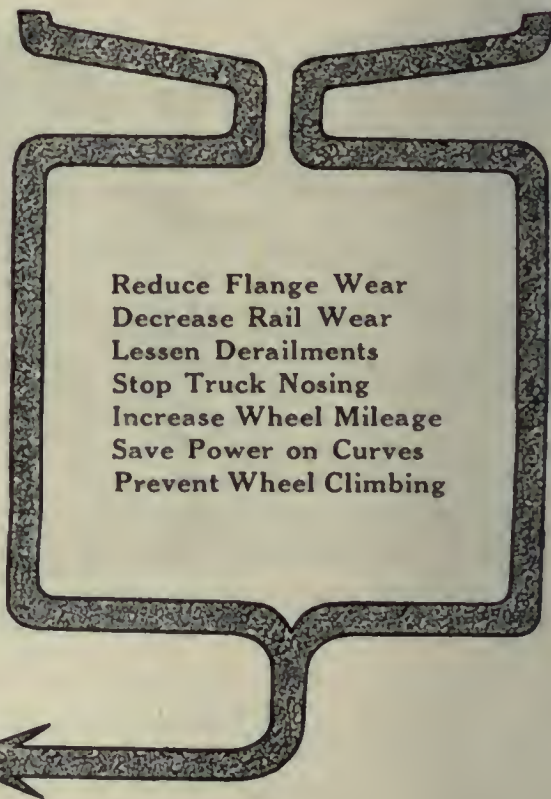
Perry-Hartman

self-centering center plates and anti-friction side bearings.

There is no economy in waiting to get new cars or trucks for this purpose when so many roads are installing Perry-Hartman bearings on old cars and getting results in time and money saved.

These bearings can be readily placed on almost any truck and body bolster. The side bearings, stop binding between the bolsters, which is the chief cause of excessive rail and flange wear. The centering center plates prevent truck nosing or lurching from side to side, which wears out rails and flanges and constantly racks the whole car body.

Moreover, the cost of these bearings is little more than friction plates. Their maintenance is nothing, and wheel turnings which they save will soon pay for the new bearings.



Reduce Flange Wear
Decrease Rail Wear
Lessen Derailments
Stop Truck Nosing
Increase Wheel Mileage
Save Power on Curves
Prevent Wheel Climbing



Send to nearest office for new catalogue describing these bearings and showing types of application.

Holden & White Inc.

Electric Railway Sales Distributors for The Joliet Railway Supply Company

817 Fisher Building, Chicago

National Railway Appliance Company, New York and Washington; W. M. McClintock, St. Paul; Alfred Connor, Denver; C. E. A. Carr, Toronto; F. F. Bodler, San Francisco; S. I. Wallis, Los Angeles; L. Brandenburger, Salt Lake City.

You Use a Screw-driver to Focus the New "Golden-Glow"—Headlights—Much Easier



In the new "Golden Glow" Headlights for city and suburban service another refinement in design has been made in that the lamp may be focused more accurately and with greater ease.

The mechanic need only turn the focusing screw which is found in the headlight case under the rim of the door. Thus he may move the lamp inward or outward and at the same time observe the effect on the beam. See illustration. Once focused this screw mechanism will hold it permanently.

ELECTRIC SERVICE SUPPLIES Co.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA

17th and Cambria Streets

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50 Church Street

CHICAGO

Monadnock Building

Canadian Distributors: Lyman Tube & Supply Co., Montreal, Toronto, Winnipeg

9 everyday business errors

1. Neglecting to get receipts when bills are paid in cash.
2. Neglecting to keep receipts where they can be located.
3. Neglecting to check up items in current bills.
4. Inability to keep checkbook balanced.
5. Too easy optimism in starting credit accounts.
6. Careless handling of valuable business papers.
7. Signing documents without knowing their contents.
8. Tendency to establish living expenses which would exceed income and eat into savings.
9. Tendency to invest money on dangerous hearsay — without proper knowledge of facts.

-The TENTH Error

This clipping from a recent newspaper advertisement, tells a valuable story. But it overlooks one of the *biggest* business errors—

Neglecting to use the

SEARCHLIGHT SECTION

It is a bad business error to overlook the opportunities that this Department puts at your disposal.

Whether you wish to buy or to sell—to secure contracts—to reach the men whose services you want or to whom you wish to sell your services

—the “Searchlight” offers you the opportunity to reach the largest possible number of your prospective customers.



ANACONDA

Copper Wire

— *from mine to*
Finished product

*Anaconda Wire and Cable
used in C. M. & St. P.
Rocky Mountain
Electrification*

*Write for a Copy
of the ANACONDA
Booklet Sent
Free on request*

Wherever copper wire is used for conveying electric current, the name "Anaconda" is recognized as a standard of excellence.

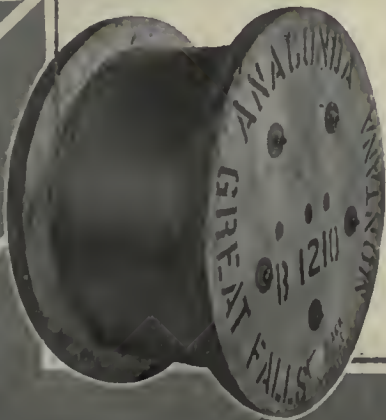
So wide is the belief in the superiority of Anaconda products that millions of pounds of Copper Wire and Cable are shipped each month from our mills at Great Falls to supply the markets of the world.

Anaconda Copper Wire and Cable are manufactured in sizes and degrees of hardness to meet every requirement. Each step from the mining of the ore to the delivery of the finished product is carried out under the supervision of skilled workers in the Anaconda organization.

*It pays to specify Anaconda. It's
your guarantee of highest quality.*

ANACONDA COPPER MINING CO.

*Rolling Mills, Great Falls, Montana
General Office Rolling Mills Dept. Chicago*



Each Track Grinding Problem Successfully Met by Rotary or Reciprocating Grinders



We are now in a position to solve every track grinding problem that arises with the maximum amount of success.

To meet conditions where our Reciprocating Track Grinder would not quite give best results we have now bought out the Atlas Rail Grinder. This machine as you all know is a rotary and like the Reciprocating Track Grinder is so built as to give simplicity in operation, low maintenance and high efficiency.

New bulletins are being published as well as new features being added to it. It would be to your advantage to get in touch with us.

Many Electric Railways who are now using our famous Reciprocating Grinder also find use for the Rotary. Let us hear from you.

Railway Track-work Company

• 30th and Walnut Sts., Philadelphia



“Little Giant” Speed Makes Screw Spikes Economically Practical

LITTLE GIANT Electric Spike Drivers, by virtue of their speed and economy, have made possible the adoption of the screw spike—now widely recognized as far superior to the old nail spike. Screw spikes hold the tie right and do away entirely with that shattering of the fibres of the tie, which invites decay, and which invariably occurs during the sledging in of the nail spike. Today many railways are using the screw

spike—and “Little Giants” for driving them. Watch a “Little Giant” on the job. The spike is set; over the head the operator places the “Little Giant;” the turn of a switch and the powerful rotary tool is screwing down the spike. When the pressure of the spike head against the rail has reached a predetermined amount—off goes the circuit breaker—and the drill stops. This means uniform holding tension at every spike.

The Little Giant Electric Spike Driver is but one of a line of electric tools for railway shop and track work, of which Little Giant Drills, Track Drills and Grinders, and Boyer Pneumatic Hammers are important members. Write for Bulletins.

Chicago Pneumatic Tool Company, 1062 Fisher Building, Chicago

Sales and Service Branches all over the World

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BOSTON CINCINNATI CLEVELAND EL PASO EVANSTON LOS ANGELES MINNEAPOLIS PHILADELPHIA RICHMOND SALT LAKE CITY SEATTLE ST. LOUIS TAMPA WASHINGTON WHEELING WILKINSON WYOMING

BOYER PNEUMATIC HAMMERS · LITTLE GIANT PNEUMATIC AND ELECTRIC TOOLS
CHICAGO PNEUMATIC AIR COMPRESSORS · VACUUM PUMPS · PNEUMATIC HOISTS,
GIANT OIL AND GAS ENGINES ROCK DRILLS · COAL DRILLS

LITTLE
Electric



GIANT
Tools

Once more we ask: Have you posted yourself thoroughly on the improved service resulting from the use of

Lackawanna

Safety-head Angle Bars?

Previous announcements of this series have dwelt at length upon broken angle bars, but not because broken angle bars are a novelty or of rare occurrence. Most of your fellow track men will acknowledge that broken angle bars make a serious and annoying problem for them as well as for everybody else responsible for safe track.

You doubtless fully realize the dangers of broken bars, and the desirability of employing any device that will prevent this trouble. We therefore wish to urge you once more to carefully read our previous announcements, if you have not already done so, and then give due consideration to the possibilities of making your rail joints safer. Once you un-

derstand and fully appreciate the Lackawanna Safety-head Angle Bar, the effective way in which it avoids the worst causes of angle bar failure, you will at least want to give this device a trial.

One of the first roadmasters to install Lackawanna Safety-head Angle Bars put them into service about six years ago on a section of main line track subjected to exceptionally heavy traffic and where the breakage of angle bars had become a serious and expensive menace. We are told that in all the time since Lackawanna Safety-head Angle Bars were installed not a single instance of a broken bar has been recorded on this stretch of track.

Lackawanna Safety-head Angle Bar and detail of the improved safety-head depression which prevents surface wear and cutting underneath the end of the rail head.





The use of Lackawanna Safety-head Angle Bars makes for safe long-lived rail joints and does so at a cost that leaves no reason for being satisfied with less efficient construction.

THE PRINCIPLE OF THE LACKAWANNA SAFETY-HEAD ANGLE BAR consists in depressing the hot metal at the location of the center of the head of the bar to a depth not exceeding $\frac{1}{8}$ -inch and for half an inch on each side of the rail ends where they meet. This prevents the sharp under corners of the rail heads at the ends from cutting or wearing into the bar and impairing the

strength of the metal. The sectional area of the bar at the depression is not reduced, nor is the original rolled surface and finish changed in character. The bar therefore retains its full original strength at this most critical point, where with an ordinary angle bar wear is practically certain to develop and cause a dangerous condition.

We also make plain fish plates with center depressions in top and bottom to afford the same advantages.

Let us submit cost and performance data.

The Lackawanna Safety-head Angle Bar is your own section made break-proof

Other Lackawanna Aids to Better Track

The Lackawanna Deseaming Process

to which all our rails are subjected, leaves the rail head and base free from the cracks and weak, stressy, laminated, partially decarburized metal that under the ordinary manufacturing processes in an inherent cause of undue surface wear and rail fracture.

The Lackawanna Hook-Shoulder Tie Plate



is simple, strong, durable, convenient for installation, and by holding the rail with great security prevents undue wear and destruction of material, saves repair costs and reduces maintenance labor.

Two ribs on top form a channel in which the rail base rests. One of the ribs is plain and the other hooked to make a holder. One or two plain spikes on the plain rib complete the tie by independent plain or screw spikes. The plate is fastened to the rail flanges. The plate may be removed without disturbing the plate.

Lackawanna Track Bolts and Spikes



Our track bolts and spikes of all standard sizes for light or heavy rails enjoy an enviable reputation for careful, accurate workmanship and finish.

The Abbott Rail-Joint Plate



"BUILT LIKE A BRIDGE"

the rail ends from battering and breaking down.

strengthens and otherwise improves ordinary angle bar joints of standard and light tee and girder rails. Its use assures smooth running track surface without the necessity of constantly raising and tamping the joint ties, avoids annoyance and expense from worn and broken bolts and angle bars and protects

The hard steel and combination of reversing flange with the plate provides for internal stresses and imposes the load on the two joint ties with about the same action as between a short deck bridge and its piers. Upturned corner lugs engaging the ends of the angle bars act as anti-creeper and as rail guards to prevent misalignment if the angle bars break or become loose.

Abbott Plates are equally applicable to and advantageous on new or relaid track and will extend the life even of old track for several years.

These plates are made in types especially suitable for ordinary steam railway service, for use in paved streets and for welding to the rail base, and may be held with either screw or ordinary spikes.

Write for our booklets, "Lackawanna Deseamed Rails," "Lackawanna Improved Track Appliances," and "Lackawanna Track Bolts and Spikes."

Lackawanna Steel Company

General Sales Office and Works: Lackawanna, N. Y.

Atlanta Boston Buffalo Chicago Cincinnati Cleveland Detroit New York Philadelphia St. Louis San Francisco
Sole Exporter of Our Commercial Products: Consolidated Steel Corporation, 165 Broadway, New York.



Aluminum Cable Steel Reinforced

FOR ELECTRIFICATION WORK

A. C. S. R. has been in commercial service for 10 years with universal success. The above illustration shows the use of A. C. S. R. as catenary cable on The Lake Erie & Northern Railway in Ontario. This cable is the equivalent of two No. 4/0 copper conductors and represents the entire conductivity required for the operation of this road which is over 50 miles long. The trolley wire being of steel has a maximum of strength combined with minimum cost.

Aluminum Company of America

GENERAL SALES OFFICE

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England: Northern Aluminum Co., Ltd., London

Power Saving Plus Other Economies

From Transportation Standpoint

- (1) A substantial saving in car propulsion energy consumption.
- (2) Only device affording direct means for putting cash value on follow-up instructors' efforts in reaching motormen.
- (3) Economies in scheduling and selecting various types of equipment.
- (4) An open-face device which earns and retains the greatest goodwill of car crews toward power-saving work.
- (5) Shows actual energy cost of one-car vs. two-car trains.
- (6) Distribution system relieved of part of its load.
- (7) Motormen cannot improve meter records by taking chances through deferring braking.
- (8) Does not put premium on "canonball" acceleration.



From the Mechanical Standpoint

- (1) Shows most efficient equipment for given service.
- (2) Less brake shoe and wheel wear.
- (3) Less roasting of coils and grids.
- (4) Quick detection of short fields, binding brakes, nosing trucks, etc.
- (5) Not necessary to hold car out of service for meter repairs.
- (6) Affords means for car inspection on the Kw. h. basis rather than time or mileage basis.

From the Record Keeping Standpoint

- (1) Simplicity of record system.
- (2) Completeness of mileage and power data.
- (3) Determination of all revenue and non-revenue mileage by cars, and lines for general statistical work.
- (4) Most satisfactory fundamentals for bonus system.
- (5) Promptness in preparation of results for presentation to all interested.
- (6) Direct presentation of power value items for changes in operating conditions.

Accident Savings

- (1) Crews more watchful.
- (2) Lower maximum speeds.
- (3) More uniform braking.

ECONOMY ELECTRIC RAILWAY METER

The ECONOMY Railway Meter is the only "power saving" device which measures car operating efficiency directly in units of energy consumption. The only one permitting a direct presentation of results.

Also, the meter is the only device which functions both while, and in proportion to, the demands for power as they are being made. This is an important factor on properties in hilly countries—important from the standpoints of power saving, safety first and satisfaction on the part of the motorman.

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ECONOMY ELECTRIC DEVICES COMPANY

General Sales Agent

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National Railway Appliances Co., New York
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twelve years ago—

these 36-inch **ARMCO IRON** Culverts were placed in this little stream. Through every extreme of heat and cold that twelve summers and winters have brought, they have stood up staunch and sturdy, unaffected by rust, showing no sign of deterioration.

Installations such as this, made years ago in all parts of the country, have established the fact that **ARMCO IRON** Culverts are permanent improvements.



There is a manufacturer in nearly every state and in Canada, making genuine rust-resisting **ARMCO IRON CULVERTS** and other products of **ARMCO IRON** such as flumes, siphons, tanks, road signs, roofing, etc. Write for full information and nearest shipping point on products in which you are interested.

ARMCO IRON CULVERT & FLUME MFRS. ASSN.
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National Pneumatic Door and Step Control

Means Less Delay in Congested Streets

A good deal of the lower schedule speed due to traffic congestion can't be helped; but some of it can.

For example: Higher rates of acceleration and braking as well as quicker closing and opening of doors reduce the losses due to traffic congestion, because they *save the seconds*.

And seconds count when you consider that in a congested section, a car is likely to stop at every block to take on or discharge passengers. Therefore, it is necessary for both

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The use of laborless, practically instantaneous National Pneumatic Door and Step Control, including Safety Interlocking features, assures you that your men will have incentive to take advantages of every opportunity to save time because it's so easy for them to do it.

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NATIONAL PNEUMATIC COMPANY

INC.



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Works: Rahway, N. J.



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DAYTON MECHANICAL TIES

Have this as a basis

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THE DAYTON MECHANICAL TIE CO.
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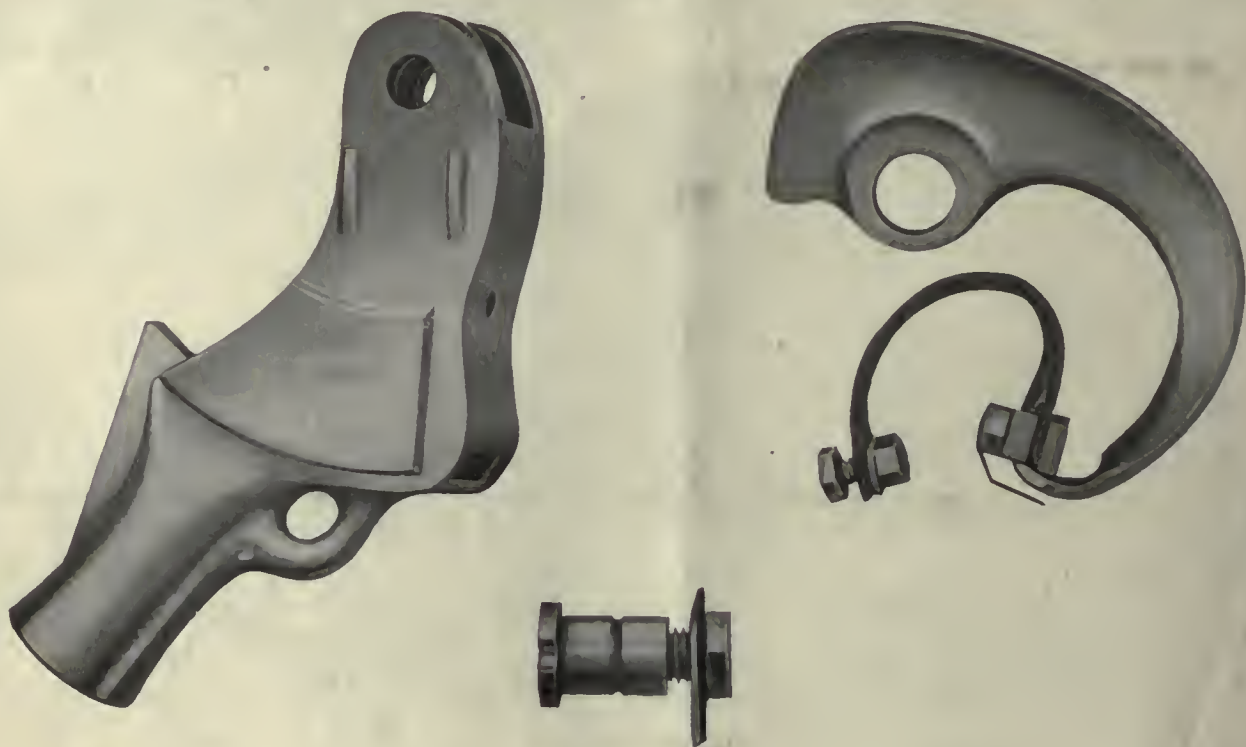


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American Steel Foundries

1100 McCormick Building
CHICAGO

DAVIS STEEL WHEELS



Simple—Still Highly Efficient

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The Miller Trolley Shoe is a step in advance of other current collecting devices in that it is the most efficient and the simplest. Com-

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The sliding type of contact has proven its superiority over other types and requires much less attention.

Let us show you what we have done for numerous other roads. Remember Miller Trolley Shoes work equally well on both city and suburban service. Write for details today.

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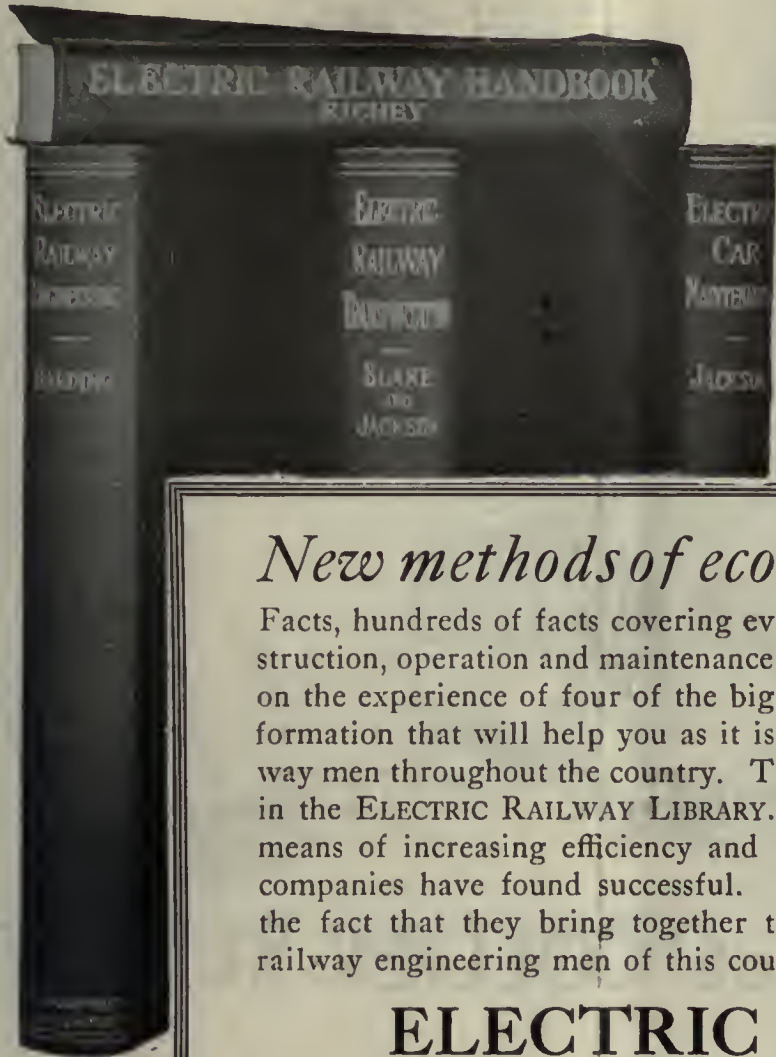
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Since local advertising contractors cannot afford to give a service which makes car card advertising a paying proposition to the advertiser—

An organization as wide in scope as COLLIER SERVICE has been created to meet this requirement and a continuous source of revenue is thus assured to the railway company.

Barron G. Collier
INCORPORATED

Candler Building

220 West 42nd Street, New York City

Metal Tickets Save the Day

—*Millions now in use*

Until necessity forced the retirement of the old 5-cent fare standard, there was no need for ticket fares except on some properties where they were required by ordinance. With the coming of odd-cent and fractional-cent fares the use of tickets was imperative. Paper tickets could not be properly ac-

counted for, and the situation had to be met with *metal tokens which could be registered the same as any coin in a fare-box.*

That results have been entirely satisfactory was vouched for by numerous railway men at the recent Atlantic City Convention.

Among the Advantages cited for Metal Tickets were these:

Their use permits charging fares involving fractions of a cent and the transfer from one fare schedule to another without change of coin.

Amount of cash handled by conductors is reduced to a minimum and the chance for errors or dishonesty is reduced to a minimum.

Company receives a large portion of its receipts prior to time service is rendered to customer.

Their use tends to decrease congestion in loading because change making is not required, and this decreases length of stop and makes for faster schedules;

also permits conductors to give more attention to other duties.

Their use tends to encourage riding habit because experience shows it easier to part with a ticket than to "break" another coin.

It is easier to examine metal tickets than multiple fare units on the inspection plate of fare-box.

Metal tickets outlast any other tickets and it is difficult to counterfeit them.

Any fare value may be placed on a metal ticket, and the modern type of fare-box will record the exact amount represented. The work of accounting department is simplified.

We have been furnishing metal tickets to our customers for several years past.

New orders for additional tickets *by the million* are being received every week.

We will be pleased to give the names of these companies and to quote prices upon request.

JOHNSON FARE BOX COMPANY

Jackson Boulevard and Robey Street, Chicago

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H-B Salvavidas en Mantanzas, Cuba

Meaning

H-B Life Guards in Mantanzas, Cuba

Here is a car of the Ferrocarril Electrico de Mantanzas, S. A. (Electric Railway of Mantanzas, S. A.)

Note how close the cars run to the sidewalk. Accidents are bound to occur on this line.

But note also the H-B Life Guard,—ready to protect any careless or unfortunate person from being run over by the car wheels. . . . H-B Life Guards operate automatically and instantly.

All the cars of the Ferrocarril Electrico de Mantanzas, S. A. are H-B equipped. They have front end accidents—but few of them are serious. H-B Life Guards form a "Barrier of Safety" between the fallen pedestrian and the car wheels.

"Barrier of Safety" between the fallen pedestrian and the car wheels



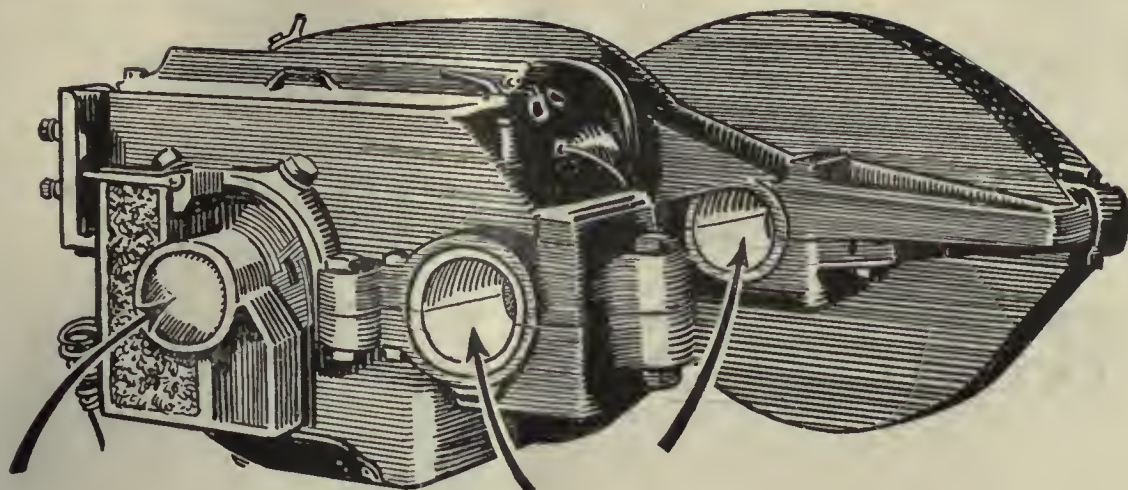
The Consolidated Car Fender Co.

Providence, R. I.

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Wendell & MacDuffie Co.

61 Broadway, New York



Why Armature and Axle Bearings Get Hot

Armature and Axle Bearing troubles are traceable in more cases than a good many men realize to poor quality packing used.

Franklin Perfection Journal Box Packing

can be used in Armature and Axle Bearing service equally as well as in Journal Box service.

As long as there is oil in the chambers The "Franklin Perfection" feeds your Motor and Axle Bearings the proper amount of lubricant to keep them running smooth and cool.

The Armature is the most expensive part of a motor. A hot Armature Bearing usually means the entire rewinding of its Armature. By preventing the hot bearings endless expense and trouble is saved.

Ask us for our Text Book on Packings, also a sample of "Franklin Perfection." You may find both a valuable aid to savings in maintenance.

The Franklin Manufacturing Company

Franklin, Pa.

Cambria Rolled Steel Wheels

It is seldom necessary to argue the superiority of rolled steel wheels over other types in these days. That they give superior service, have a much longer life and require less attention are recognized facts.

Cambria Rolled Steel Wheels are made for all classes of electric railway service, including street, interurban elevated and subway.

*Send us your inquiries.
We'll be pleased to quote you.*

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CAMBRIA STEEL COMPANY

General Sales Office, WIDENER BUILDING, PHILADELPHIA, PA.

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CONSOLIDATED STEEL CORPORATION, 165 Broadway, New York

is the sole exporter of our commercial products.

Address all export inquiries to them.

50 Years of Galena Service

FOR the past two years we have been reflecting to the electric railway industry through our advertising pages in the Journal, the tremendous effects upon modern commerce and civilization that history shows have been wrought by constant progress in the art of transportation.

- These historical references have been particularly illuminating in showing the tremendous developments which have taken place during the transition from animal power to steam and electric power.

The great bulk of this progress has occurred during the last sixty years and for 50 of those years Galena Oils and Galena Service have been constantly "on the job."

It was in 1869 that this company first put on the market a lubricating oil carrying in perfect suspension a base of oxide of lead. This is still today as it was then an exclusive process of this company. The advantage of it is to fill in the microscopical irregularities in the bearing and thus provide a perfectly smooth surface of long wearing quality.

This, at that time, new and revolutionary idea was merely the first of the long line of progressive improvements in lubrication that have through 50 years made "Galena" Oils and Service synonymous with "better lubrication at lower cost."



Galena-Signal Oil Company, Franklin, Pa.

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Gearing that helps in the fight against rising costs

■ Gears that can be depended upon for heavy duty—that do not break under sudden shocks or severe strain—gears that will wear long after other grades have been scrapped—such gears are

Grade M

The More Miles-per-Dollar Gearing

It is true economy to purchase a quality of gearing that will mean a smaller cost per year of operation. There is no doubt of this with Grade M. Their "more miles per dollar" service has been amply demonstrated by the experience of many users over a period of years. Nearly every large electric railway in the United States is an enthusiastic user of Grade M. How much longer can YOUR road afford to be without them?

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Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 54

New York, Saturday, December 27, 1919

Number 22

The next issue of this paper will be the annual statistical number. The most striking facts that the tables will show are that of the cars ordered in the United States by city surface lines nearly 75 per cent were of the one-man safety type, and that of the motor passenger cars ordered by these lines the percentage was even higher. The statistical issue will contain a suggestive symposium on the electric railway situation from a number of points of view.

Notice About Binding

THIS issue of the ELECTRIC RAILWAY JOURNAL completes Vol. 54. There have been twenty-three issues which should be included in the bound volume, namely, the twenty-two issues which carry the regular serial numbers and the report issue of the Daily, published on Oct. 11 with the report of the Atlantic City convention. The publishers recommend that this report issue, whose pages are numbered from 1 to 130, should be bound at the end of the volume as a supplement.

The editors believe that the index to Vol. 54 which accompanies this number will prove especially useful because more than the usual care has been given to its compilation. The system of key words adopted some years ago to standardize the terms used in the index has been continued and somewhat elaborated. A description of the plan followed will be found on page II of the index. A large number of subscribers to this paper bind their issues at the end of each half-year, and it is a plan which could well be followed by all.

A Decade of Mid-Year

Meetings of the Association

THE Cleveland meeting of the American Electric Railway Association, to be held on Jan. 8, will be the tenth in the series inaugurated in 1910 under the presidency of James F. Shaw. The first five of these were held in New York but beginning in 1915 a different city has been chosen each year, namely, Washington in 1915, Chicago in 1916 and Boston in 1917. They were begun because a definite need was felt by the railway executives for an opportunity to talk over pressing problems of the business away from the bustle of the annual convention and the distraction of every-day work. The conference plan sprang immediately into favor, and in due course the conference was made an official meeting of the association with full legislative powers.

At first the winter meeting was rather incidental to a group of committee meetings which were called at the same time. As the committees were naturally made up of leaders of thought and practice in the several departments of the industry a representative attendance at the conference of all branches of the business was assured. Gradually, however, the practice of holding these various committee meetings at the time of the mid-year

meeting fell into disuse, the principal reason being the general feeling that the work of the affiliated associations and of the committees should be started earlier in the association year. The present plan by which this work is begun soon after the October convention is desirable in many ways. Nevertheless, the earlier plan has many advantages and we suggest the matter again be considered before the 1921 meeting to determine whether possibly the circumstances have changed sufficiently to warrant a return to the older order.

The Mid-Year Meeting Programs

Epitomize the Industry's Thought

AS the mid-year meetings enter their second decade, one's thought naturally turns back to review the 1910 to 1919 meetings in perspective as they changed in character from conference to full-fledged meetings. All have related directly to the financial side of the industry, and it is instructive to recall that even at the first (1910) meeting, emphasis was laid on the declining attractiveness of the electric railway as an investment and on the necessity for higher fares. This led naturally to studies of the proper rate of return (1911) and to proper bases for rates of fare (1912-13). By 1913 the drive of cities for lower fares had largely subsided, but the upward tendency of operating expenses was even then so marked as to cause great apprehension, and this was seven years ago. The principles of commission regulation logically came in for attention in 1914, and the 1915 meeting was appropriately held at the nation's capital. The great war had then begun, and it was not difficult to foresee that very close relations between the federal authorities and all industrial and transportation enterprises were inevitable, especially if we should enter the war. The 1915 meeting was addressed by President Wilson, who declared in memorable words that if the companies treated their employees and the public fairly and if their methods were above reproach, they could "pile up profits as high as the Rockies, and nobody will be jealous of it." The following two meetings (Chicago and Boston) immediately preceded our entry into the European conflict, and were given over to valuation, rate of return, regulation, employees' welfare and, last but not least, the adaption of merchandising principles to the selling of transportation. No winter meeting was held in 1918, but last March many of our representative men got together to confer as to the fundamentals of economical operation which had to be applied immediately in view of the crisis forced upon them directly by the war and indirectly by several factors which would have acted adversely even without the war. These have continued to act during 1919.

The experience of the past ten years has shown mid-year meetings to be decidedly worth while, and we expect definite progress from that at Cleveland.

Massachusetts Anti-Strike Bill Was in the Right Direction

SPEAKING of the coal strike in 1902, Theodore Roosevelt said: "No man and no group of men may so exercise their rights as to deprive the nation of the things which are necessary and vital to the common life." This sound principle was again emphasized recently in several statements issued by President Wilson to the striking bituminous miners whose obstinate tactics threatened for a time to bring serious disaster upon the nation, as they had already resulted in real discomfort for millions of citizens.

There can be no gainsaying the statement that a strike which ties up the transportation of a great community is a strike invested with a public interest, and as such it should merit the condemnation of right-thinking persons everywhere. For this reason an unusual interest attaches to the draft of an act recently recommended to the Massachusetts Legislature by the Street Railway Commission, the purpose of the proposed legislation being "to secure continuity of service on street railways under public control." In brief, this bill was an anti-strike measure. It was printed in full in the JOURNAL of Nov. 8, page 873, and while it subsequently failed of passage the issue involved deserves serious consideration.

People no longer question the right of men to combine and strike for a lawful purpose, but when in doing so the strikers trespass upon other rights which are no less sacred, a sharp line must be drawn between the liberty of the individual and the interests of the greater public. This is peculiarly true in the case of a strike on a railway system. Here is involved the distinction between the carrying on of public utilities and of a private enterprise.

Presumably, a person enters the service of a public utility voluntarily. He may quit that employment without hindrance when he chooses to do so. But when the public service is interfered with "by concerted action, combination or agreement" of employees, as the proposed Massachusetts act contemplated, a greater issue is at stake. As the United States Supreme Court pointed out in passing upon the validity of the Adamson law, the right of an employee to leave the employment if he desires and by concert of action to agree with others to leave, is "necessarily subject to limitation when employment is accepted in a business charged with a public interest." Also, in the well-known Debs case, the Supreme Court sustained the action of the lower tribunal which took steps to prevent the wrongdoing of one resulting in injury to the general welfare.

Agitators and supporters of the radical labor point of view often are heard to say that proposals to prevent strikes have a tendency to create "involuntary servitude." As a matter of fact, the law which was recommended in Massachusetts would not restrain a man from refusing to work, but it would prevent his stopping an important public service by a combination with others.

Thinking people of all civilized nations have had occasion in the past year to give more than the usual amount of serious consideration to the labor situation. Apostles of discontent have sown the seeds of dissension everywhere, and there seems to be an almost universal demand for the highest possible pay for the least possible amount of work. It would seem that the average workman no longer takes pride in work for itself and

that he places his pay above all other considerations. While this situation in itself is fraught with peril, the disturbances are still more threatening when they tend to paralyze whole communities in their commercial and social activities through strikes on street railway systems or in any business affecting the greater part of the public. We believe from recent public utterances of candidates for political office and other reasons that sentiment is tending toward passage of anti-strike legislation as regards the kind of properties mentioned, and we look upon it as a tendency in the right direction.

Some More Bus Calculations

IN OUR issue of Nov. 1, we had occasion to analyze some recent bus-promotion literature under the title of "Bus Facts Versus Bus Fancies." This time we are not concerned with the J. Rufus Wallingford promises of the private promoter, but with the optimism of the municipal officer who confuses utility to the public with profit to its civic purse. As an instance, we have in mind the estimate of bus costs presented to the Board of Estimate and Apportionment, New York, on Nov. 21, by Grover A. Whalen, Commissioner of Plant and Structure. Mr. Whalen is the official who is in charge of the extemporized bus services that are now in vogue on nearly a dozen lines, either to replace abandoned car lines or to give a more convenient service than is possible with the disrupted routes of some of the railway companies. Realizing that the present scheme of haphazard operation with individually-owned buses cannot be continued with safety to the public, let alone fairness to the railways, Mr. Whalen has presented an estimate for a municipal bus system.

In figuring that of 100 buses, not more than ninety-two would be constantly available, Mr. Whalen is within bounds; nor is his estimate of \$5,500 for a twenty-six or twenty-seven-seat bus unreasonable. It is also noteworthy that he has allowed 30 per cent for depreciation, although a careful bus operator might get up to five years effective life. On the other hand, his estimate of \$10,000 each for "spare parts" and "garage equipment" totals only 3.6 per cent of the \$550,000 required for new buses in comparison with an allowance of 10 per cent by actual operators of bus systems. A responsible bus company, just like a street railway, must also be prepared to operate in snowstorms and on icy pavement. Hence snow scrapers and sand spreaders are a necessity unless the buses are going to stay in the garage until the street railways and the street cleaning department clear the streets for them. Mr. Whalen's estimate makes no allowance for such equipment; nor can we find any reference to the service vehicles which would be needed for pulling in broken-down buses, carrying repair parts between the garages, handling cash, etc. Unless the "garage" item of \$25,000 covers all storage and upkeep structures the omission of "land and buildings" indicates that a kindly city will place facilities of that nature at the disposal of the bus department! This is a typical instance of how real costs can be covered up in an undertaking where one department can sponge on another.

In the still more important matter of operating costs we are informed that the total daily charge per bus will be \$17.40, which compares with an actual derived average cost of \$20 a day for smaller buses in the same service. As a matter of fact, the cost of operating buses of less than the capacity proposed has run as

high as 35 cents per bus-mile. To secure more than seven 5-cent passengers per mile average with a twenty-seven-passenger bus in order to break even means that the bus services will have to stick to the short-haul, dense-traffic sections. In other words, neither the city of New York nor any other operator of buses can make money at a 5-cent fare unless said operator deliberately robs the electric railway of its only profitable traffic. If, on the contrary, the bus services are for localities where the street railway is no longer available, or accessible, they will undoubtedly be a public benefit but a financial loss generally. Our objection is simply that our public officials deceive both themselves and their citizens when they fail to point out that they are embarking on a general philanthropic enterprise, whereas some give the impression that there's a lot of money in it. The bus is bound to have an ever-wider field as highways continue to improve and electric railway burdens continue to increase, but let it be understood that wherever there is any worth-while density of traffic an organized, responsible, 365-days-a-year bus service costs more and not less than the modernized electric railway.

True Economy Must Operate from the Bottom Upward

SEVERAL pages in this issue are devoted to a symposium on operating economy which formed an important part of the program of the Grand Rapids meeting of the Central Electric Railway Association. It is worthy of careful study because it gets right down to the ground in this matter. There is apt to be a great deal of talk about economy without much real saving being accomplished unless the co-operation of the ultimate spenders of a company's money is enlisted. On the other hand, without a comprehensive view of the matter undue attention to detail may result in a policy of "saving at the spigot and wasting at the bung-hole." The Grand Rapids symposium ought to be helpful in guiding the thought of the readers between these two extremes.

The program committee for the C. E. R. A. meeting asked F. R. Phillips to outline the field of possible electric railway savings preparatory to having the details of the many-sided problem presented by representatives of the several component departments. The theory of this is ideal, it is the basis of conferences of competent advisers which in these days are held before any important matters are decided. And it worked out very well in this case. To be sure all departments do not agree in details. For example, the operating man wants more car speed to cut down labor and other costs chargeable to him, while the claim agent fears that too much speed may cut into the allowance for accident claims. Obviously a compromise must be effected here. The master mechanic says that the painstaking work of the shop men can be "knocked into a cocked hat" by a few minutes of reckless operation. Obviously the far-reaching effects of carelessness need to be preached to the car crews if the mechanical department is to be placated. But why multiply illustrations? These indicate the principle which we have in mind, a principle which is being applied increasingly well. We hope that maintenance costs will be sensibly decreased as a result of the discussion at Grand Rapids. Also, the poly-sided symposium plan of program so profitably used there might well be used at other meetings and on other electric railway topics.

Municipal Roads Are Not Independent of Economic Laws

DELEGATES to the conference of the Public Ownership League of America, held recently in Chicago, appeared to be a well-satisfied aggregation as they adjourned after adopting resolutions in support of the principles to which they are all committed. They had heard their leaders tell of the growth of sentiment in favor of public ownership, and they seemed happy in the thought that the dawn of a new era was at hand.

Two papers were read at that conference in which statements were made which tended to show that even municipal ownership cannot accomplish the impossible—that is, pay all the costs of street railway service out of a 5-cent fare. One of these was made by the city engineer of San Francisco who had much to do with the construction of the municipal line, and the other by the chief executive of the Seattle property. Of these two roads, the former is one of the oldest, and the latter is the largest of our municipal railway undertakings.

Mr. O'Shaughnessy of San Francisco explained that it had been the custom to set aside 18 per cent of the gross receipts to cover depreciation and damages. He admitted that in order to meet the July expenses it was necessary to borrow money from this fund, and he did not know whether this practice would be continued. He also conceded that "it is much more desirable that the returns to the corporation or to the municipality be sufficiently high to insure first-class service rather than to retain a low fare and allow the service to deteriorate."

Mr. Murphine of Seattle declared that no amount had been set aside for depreciation of the municipal railway—that the authorities believed rather in spending this fund than in allowing it to accumulate. He did not think it a proper railway expense under city ownership and management to care for and maintain that portion of the street covered by tracks, and this is not being done in San Francisco. This official also admitted that municipal ownership alone would not make a nickel fare go as far as formerly, saying that it would have to be accompanied by relief from franchise obligations and by economies in operation. "Relief from all franchise obligations is imperative," said he, "and under public ownership and management there can be no just reason why any portion of the nickel fare should be taken to pay other than legitimate railway expenses."

A Massachusetts advocate of public ownership recently said: "Even if public ownership be adopted we shall have to utilize the service of human beings." He might just as truly have said that under public ownership a nickel fare would not be found any more elastic nor would it have lower expenses to meet either for labor or materials.

These M. O. "fans" are inclined to be very frank among themselves. They admit that they cannot work miracles. But they do boast that they can furnish local transportation for a 5-cent fare "if"—Ah, there's the answer!—if they are relieved of non-transportation charges such as paving, taxes, etc.—burdens which they have been refusing for years to lift from the shoulders of those who have been striving to make a success of the 5-cent fare under private operation.

As a recent Massachusetts report stated: "Public ownership will not change these facts. All these amounts must be met either by the car rider or by the taxpayer, whatever be the system of ownership or management adopted. Facts exist even when concealed by the magic mist of public ownership."

Preparing the Public for the Zone Plan

The Inauguration of the New Method of Charging for Transportation on the Connecticut Company's Lines Was Preceded by a Long Program of Publicity

SUPPLEMENTING the general article on the inauguration of the zone plan in Connecticut, printed in the Nov. 8 issue of this paper, the officials of the Connecticut Company have furnished more detail regarding the methods used in preparing the public and the employees for the new system. According to these men the chief fact by virtue of which the zone system was established on the company's 700 miles of track without the slightest disturbance from the public or material interruption of service was the existence of close co-operation between the company and its employees, and between the employees and the public. The zone system is declared by all of the officers of the company to be "an unqualified success." It was inaugurated on Nov. 2. Eight days later the company issued a statement to the press that the system was a success and that, while it was too early to make financial comparisons, the situation was very satisfactory.

COMPANY AGREEABLY SURPRISED AS TO REVENUES

Since that announcement was made there has been a steady improvement, both as to the smoothness of the system's operation and in the company's financial condition. Although the company expected a temporary decrease in revenue when the new system, with its radical changes in the customs of passengers and crews, was established, there was only a single day that showed a decrease in revenue as compared to the corresponding day in the preceding year, that day being the one which had to be compared to "armistice day" of 1918, when railways throughout the country did holiday business.

The co-operation which made possible the successful establishment of the new system was not brought about in a day. It was the result of a very carefully planned educational campaign, designed first of all to inform the company's 4500 employees regarding the condition of the company, and, secondly, to bring the public to realize that the continuance of electric railway service in Connecticut—and anywhere else, for that matter—depended entirely on the willingness of the people to pay a fare that would enable the company to meet its obligations and obtain a return on its investment, so that it might provide the improved service made necessary by the growth and development of the communities. This educational campaign was a success.

The decision to try the zone system had been under consideration for many months before it was put into effect, for the company concluded not to make the change until the most favorable time came. Meantime the campaign to educate the employees and the public as to the necessity of obtaining increased revenue was carried on.

SERVICES OF A NEWSPAPER MAN WERE SECURED

About a year ago President L. S. Storrs decided that the time had come when the company should employ an expert in publicity. Although it is one of the largest

electric railway properties in the United States, the Connecticut Company had never attempted any definite program of education. Mr. Storrs obtained the services of a man who had spent his life in the editorial end of the newspaper business, and who had, in some degree, been a student of street railway problems. The company gave him the title of "Executive Assistant," and told him that it was largely up to him to work up a program and carry it through, subject of course to the approval of the president.

The first work attempted was the education of the company's employees. As a beginning, a short bulletin, printed on the president's letterhead, was mailed to the home address of every employee to emphasize how important it was that the company should win the goodwill of the public. It declared that the officers and the employees formed "one big family" which must work together, and called on every officer and employee to give the company's problems his very best thought. It invited suggestions from the men and included a sheet bearing the letterhead of the company and the following paragraph:

"I believe the service of The Connecticut Company on the ——— Division would be improved if attention were given the following matters:"

An envelope addressed to the president was inclosed with this letter so that employees might have every facility for sending in their comments. This letter resulted in several hundred constructive suggestions being received by the company, many of which were valuable.

STATE COMMISSION INQUIRY "AIRED" THE COMPANY'S NEEDS

About the time this circular was sent out an inquiry into the condition of the electric railways of the State was begun by a special commission appointed by the Governor and the General Assembly. The hearings before this commission resulted in much publicity about the condition of the company, which, because of increased expenses, had been unable to pay its State taxes or to meet various other obligations. These hearings focussed public attention on the railways and as it had been known that The Connecticut Company, which then had a 6-cent fare, was considering a higher fare, there was considerable guessing in the newspapers as to what the company would do.

Then came the report of the special commission to the General Assembly, and hearings before committees of the assembly to which the bills reported by the commission were referred. Everybody agreed by this time that the electric railways of Connecticut needed help, but the legislators and other representatives of the cities and towns who appeared before the legislative committees were unwilling that their particular communities should be deprived of any of the financial assistance the railways were required by law to give them. The limits to which the Legislature was willing

to go were the passage of a bill requiring bonds for jitneys and the instruction of the Public Utilities Commission of the State to investigate the electric railways and report to the next General Assembly.

The denial by the assembly of the relief from paving and bridge obligations, and other assistance sought by electric railways, served to emphasize their condition, and the guessing of the newspapers as to what The Connecticut Company would do went on. There were guesses that the fare would go to 7 cents, that it might be 8 cents, that it might be 5 cents, and that it might be a zone system. None of the guesses was ever specifically denied. The company said in every instance that when it was ready to announce what it would do a full statement would be made to the public.

In the meantime the company had sent bulletins to the employees on the amount of money that had to be spent through accident claims, and a graphically compiled bulletin showed the manner in which the 6-cent fare was spent as compared with the distribution of the 5-cent fare in 1916. This bulletin showed the employees that practically one-half of every fare taken in was paid to them in wages, and it called attention to the increased expenditures for power and equipment, and the diminution of the return on investment to an almost negligible percentage.

While the company was carrying on its own campaign of education the Committee of One Hundred was presenting the case of the electric railways before the Federal Electric Railways Commission in Washington. The Connecticut Company sent out 1500 copies of the daily reports prepared by the Committee of One Hundred to a list of city and town authorities and influential business men throughout Connecticut. It sent out 2500 copies of a booklet containing excerpts from testimony published by the committee. It saw that the newspapers in its territory obtained the testimony which was of particular local interest.

Every member of The Connecticut Company section of the American Electric Railway Association was supplied with a leather loose-leaf book in which could be placed printed leaflets containing information about the industry and about the company in particular.

About the end of last summer the public was prepared for any announcement the company might make. The public and the men knew that the company had to do something to increase its revenue.

GETTING READY FOR THE ZONE SYSTEM

In the meantime the officers and managers were working in close harmony on the details of the zone system. It was looked at from every angle. If anyone thought that a certain feature which "looked good" to somebody else was really not desirable, he presented his objections, and if he proved his case his advice was taken. Before any announcement of the zone system was made, every officer, manager, superintendent and foreman was told about it, among those to get advance information being the joint conference board of the employees' organization.

On Oct. 6 the company issued a brief statement that it had decided to put the zone system into effect. This statement gave only scanty details, but said that ten days notice would be given before the system became operative.

This announcement created great interest, yet there was no opposition to the zone system on the part of the

press with the exception of certain newspapers that had been constitutionally opposed to anything the electric railways might seek, and whose opposition had been expected. Certain chambers of commerce and similar organizations did become very much interested, however, and arranged for conferences with President Storrs, who very frankly stated the position of the company, and in all cases convinced his hearers of the fairness of the zone system and the justice of the company's case. The newspapers were supplied with abstracts of the statements made by Mr. Storrs so that there might be the fullest publicity as to the reasons for the adoption of the zone system by the company.

On Oct. 20 the company announced that the system would be effective on Nov. 2. From the day of the announcement until the new system was inaugurated Mr. Storrs was at the service of the public. Any organization that invited him to discuss the situation found its invitation promptly accepted. At the meetings those present were invited to ask questions which were gladly answered. In the meantime meetings of the company's employees were being held at which the details of the system were repeatedly given. Every man showed the keenest interest in the new system.

THE NEWSPAPER ADVERTISING CAMPAIGN

On Oct. 27 an intensive advertising campaign was started. Advertising space was bought in practically every newspaper in all the cities and towns served by the company. Advertisements were run every day giving the details of the system. Passengers were informed that beginning Nov. 2 they should enter cars at the front door, get a zone check from the motorman, take seats as near the rear as possible, have change ready for their fares, pay their fares before the car stopped at their destination and step to the platform ready to alight when the rear door was opened. This information was repeatedly given, and information regarding the new transfers was carefully disseminated. In large cities full-page advertisements containing the zone boundaries were printed on the two days preceding Nov. 2. On Nov. 2 and 3 a large advertisement was run declaring that "The Zone System Is the Public's Suggestion as the Best Means to Increase Trolley Revenue," in which it was stated that the zone system was the only fair and logical means of charging for street railway rides, that there were certain alternatives from which the public could choose if the zone system should fail, that while the company knew that there would be delays in service the first few days of the new system these delays would be much less serious than passengers might imagine and that very quickly conditions would become normal again.

In connection with the newspaper advertising the company sent out posters printed in six languages for distribution in factories on its lines, where thousands of men unable to speak or read English are employed. The foreign language press was extensively used also.

Placards informing the public of the new fare, asking its co-operation in maintaining schedules were liberally used. Three days before the system went into effect a personal letter was mailed to every employee describing the details of the system and calling on the men for their co-operation. This circular among other statements contained the following:

"The success of the new system depends in large measure on the co-operation of our employees. We be-

lieve that you will heartily work with us to make it a success."

It asked the employees to be helpful to passengers, to take a personal interest in the successful operation of the system and to bear in mind that the company could not continue to pay good wages or even to run the cars unless it could obtain sufficient income to pay its bills.

ADVERTISING SMOOTHED THE WAY FOR THE LAUNCHING

The results of all this preliminary educational work were apparent on the first day the zone system was applied. Passengers seemed to know that it was to their advantage to go immediately to the rear of the car so that they need not have far to walk when their destination was reached. Most of them had correct change for their fares, although there were some whose humor it was to present bills. But the public had been so thoroughly drilled regarding the necessity of having exact fare ready that those who sought to delay service heard caustic comment from other passengers. The public itself co-operated with the crews on the cars. The crews showed a most wonderful co-operative spirit toward the public and the company. Even during the first two days there was no serious delay on any line, although in some of the cities served by the company the streets are narrow, automobile and jitney traffic is very heavy, and traffic conditions are unfavorable.

It was to be expected that there would be protests against the zone system, and some have come from communities where commutation rates formerly had been effective, but where, under the zone system, they are abolished. Hearings on the system are now being held by the Public Utilities Commission of the State of Connecticut, but the fact is that the zone system was successfully established on the lines of The Connecticut Company under conditions which would have been considered by many as exceedingly unfavorable. The following editorial from the issue of the *New Haven Register* of Nov. 11 gives a very plain statement of what happened in Connecticut:

The trolley company quite rightly takes cognizance of the important part which the public has played in making the zone system so quickly successful. Two weeks ago there was talk of the difficulty and confusion it would cause, there were predictions of calamity, there were almost promises of attempts to defeat its purpose. But with the system in operation, those prophets of disaster found that they spoke only for themselves, that the New Haven public were determined to give the system a fair trial, regardless of their opinion as to its justice or injustice.

As a result today the zone system is adopted as a custom, the public forbearance during the trying first days, its helpfulness in assisting the employees of the company meet a difficult situation, and perhaps most of all the unexpected condemnation of all those who sought to interfere with the movement of the traffic by argument or ridicule of the system, have brought the condition related in the company's report. When the new system was first discussed, the objectors were certain that the public would never accept it and would do all they could to hinder its operation. But those objectors saw only their own viewpoint, they forgot the majority of intelligent, fair-minded people who believed in giving the company a chance. It is to this majority that the credit for the quick adoption of the system is due—and none realizes this more than the trolley company.

Comment similar to this was printed in practically every city and town served by the company.

The publicity policy which The Connecticut Company has set for itself may be summed up as follows: (1) Win the co-operation of the employees. (2) Answer every question. (3) Side-step nothing. (4) Be ab-

solutely frank. (5) Use advertising space liberally and sensibly for the information of the public.

The company feels that it does not need a "press agent" and for that reason it avoids the use of the word "publicity" so far as possible. Its information department aims never to put out an item that does not have strict news value, and that could not be printed by any conscientious editor strictly on its news merits. It believes it has convinced every open-minded newspaper man in the State of its honesty of purpose, its desire to serve and the need of public co-operation.

Edinburgh Tramways Demonstrate Resourcefulness

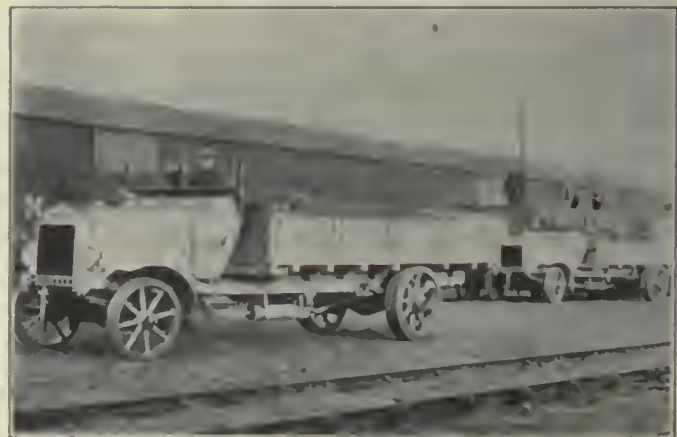
WHEN the railway strike in Great Britain suddenly cut off the usual supply of coal to the Edinburgh (Scotland) Corporation Tramways, it was necessary to have prompt action in order to keep the Tramways Department's four power stations supplied with coal. It so happened that the department had inaugurated, during the summer of 1918, a service of tourists'



TOURISTS' CAR OPERATED BY EDINBURGH CORPORATION TRAMWAYS DURING SUMMER OF 1918

pleasure cars, which starting from Princess Street, the hub of Edinburgh's universe, took tours through the most notable streets of the city not served by the tramway lines. When the coal crisis occurred, the pleasure cars were withdrawn from their usual service and converted into coal lorries, which supplied the power plants direct from the local colliery railway sidings.

The accompanying pictures show the appearance of the cars before and after the transformation.



CONVERTED PLEASURE CAR DRAWING COAL DURING RAILWAY STRIKE

An Outsider's Observations on the Connecticut Zone System

Street Railway Engineer of New Jersey Board of Public Utility Commissioners Studies Operation of New Plan and Makes Favorable Report

AT THE REQUEST of the Board of Utility Commissioners of the State of New Jersey, H. C. Eddy, street railway engineer, recently spent several days on the property of The Connecticut Company for the purpose of observing the operation of the zone system of fares which was inaugurated on Nov. 2, 1919. This system was described in the issue of the *ELECTRIC RAILWAY JOURNAL* for Nov. 8, 1919, page 852. In his report, besides describing the Connecticut plan in some detail, Mr. Eddy made a number of comments based on his observations, the substance of which is given in the following paragraphs.

Referring to the general effect of the zoning scheme, he said that the results produced were to confine the average ride to two zones and to include practically the entire built-up section of each city or community within at least the first two zones from the traffic center. Other apparently desirable resulting conditions were the inclusion of the principal business sections of the cities and towns within two zones and the riding of many of the factory workers within the same distance.

OPERATING DETAILS WHICH PROVED SUCCESSFUL

Certain details in the method of operation, according to Mr. Eddy, which tend to make the system successful are as follows: (1) Conductors pass through the cars when an opportunity affords and make change for passengers. (2) Inspectors board heavily loaded cars and make change for passengers. (3) Motormen do not have zone indicators to operate. (4) Zone indicators for conductors are so simply designed that they can be turned quickly with one hand. (5) The conductors stand inside the car off the platform, thus leaving the entire platform free for passengers who have paid their fares. (6) Neutral zone areas, extending two or three blocks from heavy loading zone points, have been established, thus relieving excessive loading or unloading at such points, and also otherwise accommodating the public. (7) Metal tokens are used for 6-cent fares. (8) Time is saved and greater insurance of collection of all fares is provided by the requirement that the passengers deposit fares in the boxes, fare boxes being exclusively used. (9) The system was liberally advertised, with suggestions as to how its operation could be facilitated, by means of posters in cars and otherwise. (10) Cars were redesigned by removal of bulkhead doors or bulkheads completely, thus facilitating the movement of passengers. (11) Both parts of double doors are used for entrance and exit quite generally. (12) Pay-as-you-enter cars are operated to and from certain industries employing large numbers of persons. The general characteristics of the property and the location of many of the industries tend to make this method simple and the result is the practical elimination of disorder and confusion.

The effect of the introduction of the zone system on transportation conditions in connection with a number of large industrial establishments was particularly studied by Mr. Eddy, and he found that the new system appears not to have been a disturbing element in handling this class of traffic. He attributed this to the

following reasons: (1) The system is so designed that practically all factory workers are compelled to pay but one rate of fare, that is, 6 cents. They know this and usually have the fare ready. (2) Service to factories is supplied by two or more lines in many cases. (3) Where heavy loads are carried to factories, pay-as-you-enter cars are operated and most successfully. (4) The trolley traffic to the factories is not generally very heavy, much of the traffic being carried by jitneys. Many factory employees live within walking distance of their places of employment. (5) Many of the large factories have several entrances and exits for employees. This eliminates the necessity of unloading cars at one point and greatly relieves car congestion and delays. The majority of the larger industrial establishments throughout the State are made up of a number of comparatively small concerns which are more or less scattered. This condition materially helps the traffic situation.

Mr. Eddy found that the public in general is at least not antagonistic to the new system and in a large measure is favorable to it, with the possible exception of the residents of Bridgeport. The employees of the company generally favor the plan, although those employed in the Bridgeport division appeared generally to dislike it. The newspapers as a rule were favorable to the system, as indicated by editorials and news items, as well as through personal interviews by the board's inspector. Again, Bridgeport appears to have been an exception to this rule.

In general, Mr. Eddy considered the zone system as operated by The Connecticut Company to be a decided present and prospective success. While he found certain defects in the system these were incidental and can, and undoubtedly will, be rectified. He summarized the reasons for the evident success of the system as follows:

1. The confidence of the public, employees and press, in general, has been obtained.

2. The company has spared neither pains nor expense in educating its employees and the public in regard to the system and its operation. The methods used indicate great foresight and intelligence in regard to the matter of obtaining the public favor and meeting its requirements and in the obtaining of employees.

3. The system of zoning and rates of fare are especially well adapted to the characteristics of the property, particularly the traffic conditions.

4. There is in general an absence of great congestion of traffic.

5. The co-operation of many factory managers was secured, these agreeing to pay their employees with the trolley company's metal tokens, an amount equal to the difference between the old fares and the new fares under the zone system. This plan was to be in effect for six months.

In conclusion, Mr. Eddy notes that the long-distance rider is the greatest sufferer under the zone system on The Connecticut Company's property, but the company reports that while there has been some complaint in regard to this and some traffic has been lost, this is not considered a serious matter and it is expected that much of the lost traffic which has gone largely to the steam roads will ultimately return. Riders of this character are few as compared with the total number of riders on the system.

The report abstracted above was signed by John P. Petty, deputy chief inspector, Bureau of Utilities, as well as by Mr. Eddy, who made the inspection.

History Hath Its Lessons

Inside Story of the Promotion, Operation and Dismantling of One of Those Railways Built On Faith, Not Judgment

By CHARLES J. FINGER

Receiver and General Manager, Columbus, Magnetic Springs & Northern Railway

ON A COPY of the official interurban map issued by the Central Electric Traffic Association that hangs on my office wall, there are marked in green the railway lines, both steam and electric, that have been, are being or shortly will be dismantled. In the states of Ohio and Indiana alone there are eighteen thus marked. In one way or another I have been able to gain an insight into the affairs of six of them. With three of them I was closely associated when the time came to wind up their affairs. One of them I watched from time of construction until the last rail was loaded on the car in the process of dismantling after a career of thirteen years. Tracing the history of that particular road and comparing it with the history of some of the others that have disappeared from the map, I find conditions in it common to many roads that to-day are on the verge of bankruptcy. A condensed history of the first line that was dismantled in Ohio, and which shall be known as the Brown line, follows:

The Brown line was built in 1903, and was dismantled in 1916. It was 24 miles long, but in the course of its brief life became the parent line in a little system that aggregated 100 miles. This system comprised three lines, two electric and one steam.

The Brown line was standard gage and connected with the N. & W. to the north and the Ohio River to the south. Midway it joined the E. J. & B. at a county seat. The original intention of the builders was to inaugurate a traffic in coal from the Pittsburgh district via the Ohio River to points in Ohio. The road passed through a county seat, with a population of 3000 and touched a town of 3500 at the river end, and one of 2000 at its junction with the N. & W. There were five other small settlements along its line. Counting the surrounding territory, the little road would perhaps serve 12,000 people. It touched the following industries: a large boat yard, three sawmills, a canning factory, a tobacco warehouse, a brick plant, three coal yards and some fertilizer warehouses.

E. Lytle, a banker of Cinatolis, who had personal interests in the neighborhood of the Brown line, was the original promoter. He induced a brother, G. Lytle, a banker in a Western state, to interest a Mr. Joyce, president of a bank with a national reputation. Being assured that the investment would take care of 6 per cent, Mr. Joyce promised his financial support.

The company organized with a local directorate, was



CAR WORTH MORE FOR MOVIE SMASH THAN ON THE LINE

capitalized at \$500,000, with a bond issue of an equal amount, and a construction company was formed. No expert opinion was taken as to the practicability of the scheme, nor did any of the three original promoters make any thorough investigation or prepare any statistical statement as to probable earnings and expenses. It seemed to be taken for granted that the mere fact of building the railroad would without other influence create traffic.

This error was also the fundamental error in the case of five other short lines in Ohio that have been dismantled with the past two years. It should be borne in mind that, despite all local opinion to the contrary, there was no idea whatsoever on the part of any of the promoters to enter into any speculative proposition or to make money by the sale of stock. In fact, in the case of five of the Ohio roads that have gone under, no stock was ever sold. The money was advanced by entirely disinterested parties.

In the case of the Brown line, the money for the construction of the road was furnished by the bank president, Mr. Joyce. Unfortunately, neither he nor his associates audited the construction company's bills. Week by week during construction, drafts were made upon Mr. Joyce for the cost of material and labor. These amounted in the aggregate to \$480,000. When an audit was finally made, which was not until the road had operated for two years, a strange state of affairs was revealed. In some cases whole payrolls had been drawn for twice. In one case a draft was made for a carload of rails that was neither ordered nor shipped. An ordinary letter written by a supply house stating what the cost of a shipment of material would be, went through the local bank and was accepted as a draft. When construction was reported finished, one half of the length of the road was entirely without ballast, and the other half was ballasted in patches. Faulty construction of course resulted in unduly heavy maintenance cost. For two years, however, after construction ceased, operating officials charged a generous amount each month to capital accounts.

STATISTICS AS TO FINANCING

It has been said that the bonded indebtedness was \$500,000. The original promoters hoped that the entire amount would be subscribed by the people along the line of the road. Instead of this no more than a face value of \$85,000 worth of bonds were so disposed of



THESE RAILS COST ORIGINALLY \$28 A TON, BUT AFTER BEING TAKEN UP SOLD FOR AS HIGH AS \$70 A TON

and the net amount of real money gained locally was not more than \$67,000. The \$415,000 worth of bonds were then turned over to Mr. Joyce as collateral for notes which were made to cover money expended during construction. By subsequent arrangement, each of the Lytle brothers was to take care of one-third of the indebtedness thus incurred. As may be inferred by so unpromising a start, the road at a very early date showed its inability to pay ordinary operating expenses. In fact, from first to last there was an annual loss ranging between \$8,000 and \$10,000. This loss Mr. Joyce continued to pay from his private and personal funds. He also paid for many years the bond interest on the \$85,000 of bonds, as it fell due, in addition to the taxes on the property.

At first blush this may seem somewhat of a unique proceeding, but I know of two other lines in Ohio for which men living in other states have acted in like manner. The psychological process is something like this. At first there is a hope that things may change. It is like a gambler playing his stake. He risks his all, and then he borrows. That is just what the men

backing some of these roads do. Finally, for a time, they keep on because there seems no way out.

To give an idea of the earnings and expenses on the Brown line from the time the "construction account" was closed, up to the time that the road was sold to be dismantled, a condensed summary is given. It should be borne in mind that the expense column does not include depreciation, taxes nor bond interest.

In 1912 and 1913, an amalgamation between two neighboring lines was effected. Both these lines were on the verge of bankruptcy. Burdened by interest charges, hampered by poor construction and handicapped by inefficient, cheap management, the annual showing had become so bad that the owners were discouraged.

MAKING A BAD MESS WORSE

Clutching at a straw, Mr. Lytle, burdened with his share of responsibility engendered by his Brown line, dreamed of a way out by amalgamating his line with these two bankrupt lines. That three ciphers added together could never make an integer, he failed to see. He persuaded Mr. Joyce, then a very sick man, to his way of thinking and a contract was drawn up between Mr. Lytle and the owners of the electric lines. A more insane agreement was never made. By its terms \$20,000 was to be immediately expended upon the roadbed of the electric lines. Two cars were also to be bought. Expensive work was to be done on a big bridge. A steadily increasing rental was to be paid, the amount of which was to be deducted from the purchase price at the end of a few years when Lytle

STATEMENT OF EARNINGS AND OPERATING EXPENSES

Years	Earnings	Expenses	Loss	Profit
1906	\$16,538	\$28,451	\$11,913	.....
1907	18,287	29,418	11,131	.....
1908	16,232	35,818	19,586	.....
1909	16,889	27,587	11,698	.....
1910	18,692	26,659	7,867	.....
1911	18,240	33,547	15,307	.....
1912	23,791	24,516	725	.....
1913	26,856	21,159	.....	\$5,697
1914	25,967	23,249	.....	2,718
1915	23,743	22,453	.....	1,290
1916	26,931	25,562	.....	1,369



BRIDGES WERE CUT INTO SCRAP AND TRESTLES WERE SOLD AS THEY STOOD—ALL AT A PROFIT

and his associates, having paid the full indebtedness of the electric lines, were to become the final and sole owners. There was also a private arrangement by means of which a parallel and competing line was to be abandoned and dismantled at an early date.

When, with proper auditing, the full meaning of the contract was understood by Mr. Joyce, he was thunderstruck. He placed the management of his affairs in the hands of a trusted friend, a man of integrity and initiative. For the first time he learned that the Lytle brothers were heavily involved. One of them fled the country. Mr. Joyce with a rare nobility, surrendered of his own accord his entire fortune to reimburse the bank of which he was president for the money loaned

owners of a non-paying property to continue to operate a losing proposition.

To clear up the receivership, therefore, the road was sold at a public sale for \$30,000, the Joyce estate being the purchaser. The estate in turn sold it to a firm of iron and steel men for \$84,000.

EVERY CLOUD HAS A SILVER LINING

Then came a strange change. Owing to the war requirements, prices began to soar. Rail that had originally cost \$28 per ton at the time of construction, were sold after thirteen years of service for \$35. The price continued steadily to climb. Within a week or two relayers with angles were selling at \$45. They climbed



SOME OF THE GATHERED INGREDIENTS OF THE BROWN LINE, AFTER IT WAS UNSCRAMBLED

the Brown line—a railroad, by the way, which he had never even seen. The mental worry and shock killed him. Mr. Lytle, the original promoter, whose speculations had widened as the circles from a stone cast in a pond, was arrested. He is now serving a term in the penitentiary.

CLIMAX FINALLY CAME

At the instance of the Joyce estate, the Brown line was thrown into the hands of a receiver. The contract of amalgamation with the electric roads was broken, but not before it cost the Joyce estate some \$60,000. Meantime, the holders of the \$85,000 of bonds, led by certain lawyers who had obtained bonds "for services," instituted a case in court asking that the bonds held by them be preferred, the road sold and the proceeds divided. One of the most able corporation lawyers in the country, an ex-governor and former cabinet member, watched the case for the Joyce estate. The case was taken through the Common Pleas Court, to the Court of Appeals, and on to the Supreme Court, but the plaintiffs' case was lost.

Meantime the receiver had financed and started a stone quarry, by means of which earnings on the road during the last three years of its existence were very materially increased. The net result, however, was not sufficient to justify continued operation. The growing popularity of the automobile, increased wages and taxes and higher cost of material all worked adversely, and upon the advice of the receiver, application was made to the state commission for permission to suspend operation. It was the first case of its kind, and apparently no law was in effect that could compel

to \$50, to \$60 and to \$70 at last. A locomotive that had been bought second hand for \$2,200, used for three years and then condemned, was sold for \$5,000. An offer was received from a moving picture concern by which it was to have the right to run an old locomotive over a bridge and into a ditch, for which it was to pay \$9,000, leaving the scrap to the owners. Another moving picture concern suggested the setting on fire of a wooden trestle and the running of a car into the flames. Price \$5,000. The right-of-way was sold to a land speculator. The wooden trestles were sold as they stood at \$30 per thousand. Ties went to coal mines. Steel bridges were cut into scrap.

To-day the community in which the railroad served, is apparently not any worse financially than when the railroad operated. Auto buses link the towns, and trucks haul merchandise. In the case of other railroads that have been dismantled the neighboring farmers have purchased and put into cultivation the old right-of-way. In some cases the counties have bought steel bridges, and, leaving them where they stood, have changed highways and pikes so as to utilize the old railroad structure.

Doubtless within the next few years several roads will suspend operation. The fact that they will do so is no more to be deplored than is the cutting out of the undergrowth in a forest. That the country will never again see such an era of wild investment in railroads as occurred two decades ago is to be doubted. The present general cleaning up of non-paying properties is in effect nothing more than the logical outcome of unwise investment. The roads that survive will be the stronger for the disappearance of the weaker ones.

Operating Economy Viewed from Several Angles

At C. E. R. A. Cleveland Meeting F. R. Phillips' Paper and the Accompanying Discussion Showed that All Departments Must Contribute to Cutting Down Costs

AT THE fall meeting of the Central Electric Railway Association, held in Cleveland, Ohio, on Dec. 4 and 5, one session was devoted to the reading and discussion of a paper by F. R. Phillips on "Economies in Car Operation." This was discussed from the standpoints of the conductor, the motorman, the dispatcher, the master mechanic, the claim adjuster and the superintendent. Abstracts of the paper and the formal contributions to the discussion follow:

Economies in Car Operation

The Giving of Good Service at Reasonable Cost Depends Upon the Closest Attention to Operating Detail

By F. R. PHILLIPS
Superintendent of Equipment Pittsburgh (Pa.) Railways

A COMPREHENSIVE plan designed to produce maximum economy in car operation falls short of its purpose if the result of its application fails to produce a net over-all saving. The operating costs of one department should not be reduced at the expense of the whole. On the contrary, it might so come about that the costs in one department are actually increased to accomplish an over-all saving.

The history of the industry shows no radical or revolutionary developments in the means for producing transportation since the adoption of the electric motor. Moreover, in my opinion, the near future holds forth no likelihood of radical changes, current rumors of startling developments, soon to be disclosed, involving the use of an internal combustion motor to the contrary notwithstanding.

The sensibility of the riding public with respect to changes in operating methods, or even maintenance or construction work, is remarkable.

We should, therefore, be exceedingly circumspect before instituting radical changes in operating methods, whatever may be the goal, if we would not disturb the very delicately balanced differential between financial salvation and oblivion.

There will, however, be found a wide field in which to search for economies without treading upon dangerous ground. Some of these will tend toward a more favorable impression upon the public.

Merely, as a guide, I have prepared a simple table of percentages showing the relationship that the expense

It is at once apparent that the most promising results in our search for economy will come through an investigation into the possibilities afforded in (a) conducting transportation, (b) reduction in energy consumption, and (c) improved methods in maintenance of roadway and equipment.

TRANSPORTATION DEPARTMENT SAVING POSSIBILITIES

The wages paid motormen and conductors constitute practically 80 per cent of the expense chargeable to the transportation account, or more than one-third of the total cost of maintenance and operation. Obviously, a reduction in the number of car-hours without reduction in car-mileage, or an increase in number of car-miles with the same car-hours, is the goal we seek.

Increased speed, within reasonable limits, meets with the approval of the patrons and at the same time, without additional burden or responsibility on the part of trainmen, secures to the company greater economy. The controlling factors in schedule speed are: (1) Rate of acceleration and braking. (2) Number of stops and slow downs. (3) Density and regulation of traffic. (4) Speed with which passengers board and alight. (5) Physical condition of roadway and equipment. (6) Time-saving facilities. (7) Efficiency of car crews. These will be taken up in order.

Rate of Acceleration and Braking. Electric railway literature is filled with elaborate speed-time curves, showing in all imaginable ways the values of the various rates of acceleration of coasting and braking. These are strictly applicable only in special cases. Moreover, the application of theoretical speed-time curves is predicated upon a degree of intelligence on the part of operators that rarely exist.

Adherence to a predetermined economical rate of acceleration under such circumstances is only possible with the aid of devices which will provide automatic acceleration.

Imagine the appearance of a speed-time curve produced by the operation of a car through congested warehouse districts, where it frequently happens that a car must follow slow-moving vehicles for several thousand feet. The situation is becoming more difficult with the advent of rapidly-moving vehicles. An actual curve representing operation of this character would hold little resemblance to the typical speed-time curve. However, all are agreed that the most rapid rate of acceleration and braking within the limits of the comfort and safety of the passengers, of the capacity of the motors and of the spinning and skidding point of the wheels is the most economical one.

Number of Stops and Slow-Downs. The agitation by the Fuel Administration during the war with respect to the efficiency of the skip stop and the excellence of the results following the almost universal adoption of the system throughout the country make elaboration superfluous. A schedule cannot be made economically effective without a thorough analysis of the number and character of slow downs or stops in a given run and the time consumed thereby. As approximately 35 per

TABLE I—SUBDIVISION OF COST OF ELECTRIC RAILWAY OPERATION

Item of Cost	Percentage of Total
Conducting transportation	45.0
Cost of power	14.7
Maintenance of way	14.1
Maintenance of equipment	11.9
Traffic	0.5
General and miscellaneous	13.8
Total	100

of each of the several branches of the operating department bears to the total. The figures are based on averages taken from the operating expense sheets of a large number of representative companies.

cent of the total elapsed time of the average city schedule is consumed in slow downs and stops, and fully as much more is lost incidentally, this feature assumes a degree of considerable importance and offers a large opportunity for a saving of time and fuel.

Density and Regulation of Traffic. Recent observation shows that there are from six to ten times as many vehicles as street cars on the street in the congested areas of some of our large cities during certain periods of the day, and the recklessness and complete abandon with which many of the vehicles are operated intensifies the seriousness of the problem of operating the cars. We are rapidly approaching a condition which may require heroic treatment.

Street railway operators, because of their peculiar training and experience in traffic matters, are eminently fitted to cope with the condition if clothed with suitable authority. The public could do worse than secure the advice and opinion of the local railway operators in the promulgation of plans for relief. Much can be accomplished by co-operation with the traffic police, the establishment and enforcement of auto parking limits and safety zones, the institution of one-way traffic streets, the installation of turnouts and crossovers to make possible the breaking up of a blockade by turning short, looping just within the congested areas to effect a thinning out of the congestion, and many other devices of a similar character.

A notable example of time saving in the operation of surface cars through congested districts is the looping system in the city of Cleveland. There all cars approaching the Public Square district via the same avenue in no way intermingle with cars of any other route using another avenue of approach. Common loading points for adjacent districts are provided and a maximum of non-interference results, the only exception to the rule being the operation of depot cars.

The character of a turn at a street intersection has also a large influence upon the time required to "negotiate" the turn. The inside turn requires 4 per cent and the outside turn 39 per cent more time for a single car to clear to permit taking advantage of the intersection than would be required on a straight crossing. Obviously, the time consumed in congested districts has a very large influence upon economy. No schedule can be maintained with any degree of accuracy or satisfaction in the absence of some measure of regularity and uniformity with which the cars negotiate congested districts.

The Speed of Boarding and Alighting from Cars. The most rapid loading ever observed by the writer was at the rate of 0.3 second per passenger, or sixty-four passengers in 19.2 seconds. Yet this same car on the same trip with a reasonable amount of promptness on the passengers' part consumed four seconds in discharging one passenger. With the modern low-step, easy-access, stepless or low-floor car, the time per passenger varies from approximately four seconds for one passenger to the previous figure for a large number of passengers. The effect of car design upon the time consumed in stops is most marked. A recent check showed that in comparison with the high-floor, end-entrance car, with large wheels, the modern, center-entrance low-floor car consumes 30 per cent less time per passenger. The saving in time is entirely attributable to the design of car. Of course, we could not consistently recommend the abandonment of present equipment to permit taking advantage of the loading

feature of more recent designs, since time saved in boarding and alighting is not sufficient of itself to warrant such procedure. However, a study of step heights and entrance ways on present equipment may be productive of surprising results.

Physical Condition of Roadway and Equipment. In the production of good service, the function of the roadway and equipment departments is secondary to the transportation and traffic divisions. The latter are upon the firing line and are helpless without the wholehearted support of the forces whose duty it is to provide the physical means for high-grade economical service. No campaign for economy through the maintenance of high schedule speeds can be successful unless accompanied by a high standard of maintenance of roadway and equipment.

Moreover, since the speed of motors is in direct proportion to the voltage impressed at the brush-holders, overloaded trolley and feeder lines and inadequacy of negative return due to bad rail joints, not only affect schedule speed, but overload the car equipment.

CARS MUST SOMEHOW BE KEPT ON SCHEDULE

Time-Saving Facilities. The maintenance of schedules, especially in the rush-hour period, has been greatly facilitated by the more even spacing of cars and rapid clearing up of incipient as well as serious blockades or other interruptions to traffic. An important thing in this connection is the institution of emergency service. Speedy auto trucks, equipped with apparatus for quick handling of break-downs, in charge of men picked because of their particular fitness for such work, are located at strategic points and dispatched like fire apparatus. They respond to fire alarms in their district and promptly clear the way for traffic. The service is augmented by the installation of street phones to which all employees have access. In addition, the telephones permit the superintendents to keep in close touch with conditions at all parts of the system.

A traffic dispatching system would be helpful in producing even spacing and loading of cars as well as clearing up blockades. The plan involves the installation of telephones at important junctions or close to the usual location of traffic inspectors whereby important information and instructions can be issued by the dispatcher, the instructions being based on the information furnished by inspectors through telephonic reports.

The use of headway recorders with a reasonable amount of accuracy to indicate the spacing of cars has been found of much value. Most large companies handle their power problems through a centralized load-dispatching system, thereby minimizing "outages" as well as equalizing the load on stations, frequently producing economy through their ability to drop off promptly unnecessary apparatus and less economical stations. Another fairly effective method of securing proper spacing and adherence to schedule requirements is the locating of centrally controlled, accurate time clocks at the principal junctions and time points. They prove quite helpful in controlling the practice of some car crews who time their watches by location rather than watch their location by time.

Again, power-operated switches in tracks under frequent headway will be usually found well worth the investment. The employment of special inspectors at the principal loading stations and intersections will also be found helpful in expediting traffic, as will also the

institution of loading areas indicated by signs wherein two or more cars stop within the area at once at an intersection. Under certain circumstances, it has been found advantageous through an arrangement with the traffic police at intersections where diverging lines meet, to stop only at the far side of the corner in order to clear the way for cars behind which take another direction.

Experience in certain large cities with the pay-as-you-leave system of fare collection has shown marked improvement in the time required to "negotiate" the congested districts. Further, the use of fare boxes, aside from their money-getting propinquities, reduces loading time.

SCIENTIFIC METHODS MUST BE USED IN CAR OPERATION

Efficiency of Car Crews. No plan of economical operation is effective unless it is properly applied and efficiently executed. After car crews have had thorough preliminary training they should follow a well-defined program of education. Most men have a sincere desire to learn and if properly encouraged will apply their knowledge in ways that are helpful, and will appreciate the elemental principles of safety and economy as applied to electric railway work.

A well-balanced, economical car-operating program must be founded upon a thorough knowledge of the value of its controlling factors. Too many assumptions may prove fatal to its successful application. Until a few years ago the traffic engineer was an unknown quantity, today he is coming into his own. Then, traffic data upon which schedules were based were the accumulation of more or less intelligent guesses, now they are scientifically prepared with precision and mathematical exactness. In large congested centers, schedule making is becoming more and more complex.

One-Man Cars. In this day no discussion of street railway problems would be quite complete without some word concerning this very popular subject. It is indisputable that under certain conditions of traffic the one-man car will prove valuable to the community as well as to the operating company. Especially is this true in communities where congestion has not reached the acute condition found in large cities, although to some extent in a number of large cities there will be found a suitable field for their use. Where headways are great their use is distinctly advantageous as compared with the two-man car.

However, we are still to be convinced that the operation of the one-man car will compare favorably with the operation of two-car units with large seating capacity, either from a standpoint of economy or convenience to the public when operated through densely congested districts where large numbers of passengers must be cared for in a minimum possible time. Furthermore, in all fairness, it should be stated that the advantages of safety, light weight, low steps, small wheels, baby motors or shiny varnish are not coincident with the introduction of the one-man car.

Energy Consumption. Our story would be incomplete without reference to power generation. Greater economies here have become absolutely indispensable. Important developments have been made in the instantaneous checking of flue gases; in the use of higher steam pressures, and in the consolidation of community generating stations. Probably one of the most important links in the chain of efficiency in power distribu-

tion is the negative return circuit. A careful survey will usually prove that the cost of maintaining good rail circuits is insignificant compared to the resulting saving in energy.

But it is in the consumption of power that the greatest opportunities for economy are to be found, not only on the cars but in street lighting, in the carhouses and shops.

On the cars there is much power loss possible in air-compressor circuits and in the heaters. Good maintenance will reduce the former and careful heat regulation the latter. There are several systems of manual regulation which are efficient, but only when supervisors and car crews are responsive. Automatic regulation is constantly attentive and does not forget.

Light-Weight Cars. In the matter of reduction in weight it is the writer's belief that we have not yet gone far enough. With the use of alloy steel and aluminum, and less elaborate facilities for lighting, heating and ventilation, an electric car can be built to weigh less than 300 lb. per seated passenger.

Power-Consumption Checking Devices. There are three types of devices for checking operation of cars, one measuring directly the energy input, one the coasting time, and the other the number of brake applications and the total braking received. Each has distinctive advantages; certainly none of them are effective without the co-operation and understanding of the car crews. The advantages of increased coasting under suitable circumstances is not to be gainsaid, but the economical car schedule is not predicated upon the degree of coasting. Most high-speed schedules for city surface cars with six or more stops per mile leave little opportunity for coasting.

Maintenance of Roadway and Equipment. It is almost axiomatic that the most economical maintenance of roadway and equipment is that which involves the highest standard obtainable. The most effective single instrument of economy is a complete system of inspection, including overhauling, and a well-defined program of reconstruction. The costs of labor and material used in maintenance have advanced in such an amazing degree that the value of frequent adjustments and thorough inspection, in order to procure from the materials used the last "ounce of usefulness," is more necessary than ever before. Next in importance is the application of the principles of production efficiency, through the use of time-saving tools and machinery, the planning and routing of materials to accomplish a minimum amount of handling, reclamation of heretofore salvaged material through the medium of welding devices, the proper selection and checking of the quality of materials, etc.

A great contributor to reduction in expense may be found in standardization of parts, by the plan promulgated by the American Electric Railway Engineering Association. This effort should receive the support of all manufacturers of materials and supplies, as well as railway men. Adherence to a standardization program will entail some sacrifice on the part of all; individual opinion on the part of railway men and an over-emphasized commercial spirit on the part of the manufacturer. We all know that standardization carried to the extreme will stultify progress. On the other hand, a lack of standardization will affect ultimate economy adversely.

No comprehensive campaign for economy can well be undertaken without thorough consideration of all the

phases entering into its consummation. Hence as specific treatment in detail of any one of the many aspects of the problem has not been possible in the limited time available for the presentation of this paper it has been necessary to deal in generalities. To sum up the whole matter, efficiency and economy are obtainable only through constant application and attention to the minutest detail, coupled with the highest degree of helpfulness, co-operation and intelligent co-ordination on the part of all concerned.

A Conductor's Point-of-View

BY CHARLES CONNELLY

Conductor Grand Rapids, Grand Haven & Muskegon Railway,
Grand Rapids, Mich.

MR. PHILLIPS' paper is rather over the head of the average conductor, so that many of the points which he makes will not be discussed here. Theoretically, the low-floor, low-step car would materially aid in the speed of loading cars, but these cars would not be suitable for interurban lines, especially those operated from third-rail, and those liable to be troubled with heavy snow drifts. There are also strong arguments in favor of standard height for interurban cars, the height conforming preferably to steam road practice. We will agree that the better the condition in which the equipment and roadway are maintained, the fewer the pull-ins, and this would seem to be economical. The standard would of necessity vary on different properties, but from a conductor's standpoint this standard could not be too high.

Referring to the education of the train crews, and especially of the conductors, the following points bear on that question: The greatest opportunity for the conductor is to see that no fares are lost to the company by failure in collection. Many fares may be lost because patrons refrain from riding except when absolutely necessary. To overcome this tendency it is necessary that a conductor be courteous and attentive to his passengers and also to the public generally, as each person with whom he comes in contact is a potential passenger.

THE CONDUCTOR IS A SAFETY AGENT

In assisting in the prevention of accidents the conductor has another opportunity for increasing the economy of operation. He should be always vigilant for the safety of his passengers. He should see that passengers have safely boarded or alighted from a car before he gives the signal to start, that objects over which passengers might stumble are kept out of the aisles and that infirm persons not yet seated are not thrown down by the starting of the car. He should be vigilant concerning train orders and time-tables, and not depend on the motorman to keep his train clear of other trains. When an accident occurs he should secure the names of all witnesses possible, make a full and intelligent report concerning the accident, and forward it to his superior officer at the earliest possible moment. In fact, he should make intelligent reports concerning anything coming under his observation that might lead to possible injuries or damages.

Again, he should make himself thoroughly familiar with the operating rules and be ready instantly to follow instructions. If a conductor is thoroughly familiar with the rules he knows at once what to do when the emergency arises.

He should also be careful when throwing switches to see that the points are properly set before signaling the motorman to proceed, and he should co-operate with the motorman at loose-tongue city switches to assist in preventing troubles at such points. Furthermore, he should be watchful at switches, curves and other points where the trolley wheel is likely to leave the wire, to prevent damage to the overhead.

The conductor should co-operate with the motorman in the economical use of current by giving notice of a stop in ample time, and in giving the starting signal promptly. He should also watch the heating and lighting of his car so that unnecessary fuel or current is not consumed.

In the handling of freight and express, proper care and attention on the part of the conductor will result in minimizing damage claims and a consequent saving to his employer. It is only with the hearty co-operation of employee and employer that a maximum of efficiency in this work is secured. Take the baggage end of the service, for example. This with few exceptions is given in connection with the passenger service and very little direct revenue results therefrom. However, if an occasional piece is improperly checked and perhaps lost or delayed beyond a reasonable time, considerable expense in the adjustment is involved and indirect injury to other branches of the service is caused. Patrons, becoming dissatisfied with such experiences, are inclined to extend their "grudge" to the entire system and transfer their patronage to competing lines.

AFTER ALL, COMMON SENSE IS THE PRIME REQUISITE

To sum up the ways in which a conductor can assist in the economical operation of his car or train, and through this the entire system, it need only be said that what is required is the right use of ordinary common sense. The trouble is that some people, in fact most of us, do not do our best; but if a conductor will remember that courtesy will make friends for himself and his employer; if he will use the company's property as he would his own; if he will do all possible to avoid accident, and make quick, full reports when they do occur; if he will not be afraid of doing a little more than his share, then he will find that when, to secure greater economy in car operation it is necessary to reduce the number of men, his name will still be upon the payroll.

How a Motorman Can Help

BY JOHN A. SUNDERLAND

Motorman Terre Haute, Indianapolis & Eastern Traction
Company, Terre Haute, Ind.

THE economical operation of a car by the motorman is a study in itself. The laws governing such operation cannot be set out explicitly in a rule book, nor can proficiency therein be attested by a diploma issued by any school except the great school of experience. The motorman must be an apt and intelligent pupil, endowed with rare good judgment, enthusiastic in his work and with an honest ambition to excel. He must be patient, slow to anger and considerate of the rights of others. The management, on the other hand, must make the motorman feel that his work is appreciated, and furnish him a comfortable, safe place in which to work. To the uninitiated the work of a motorman seems more or less mechanical, requiring but little skill and less

thought. But we know that such is far from true. We appreciate the vast amount of skill and thoughtfulness that is incorporated in the work of a good motorman. This is especially true in the great field of practical economy.

There are many ways by which a motorman can lower the cost of operation. For example, he can reduce the number of accidents to live stock, by familiarizing himself with all the permanent objects found on the right-of-way. Thus, he can, while yet a long way off, distinguish between a stump and a hog, between a tie pile and a cow; and any unusual object will at once attract his attention, thus frequently enabling him to avert an accident. The same end may be attained if he will watch the fences inclosing the right-of-way, reporting to the proper officials any defects that he notices.

Again, the use of a file at the right time, the application of a screwdriver, or the pouring of a few drops of oil just where and when it is needed will often prevent a serious and costly accident or injury to equipment. As long as cars are run, there will be costly accidents, both to stock and to equipment, with all the care that the motorman may exercise. In this paper attention will be directed to a means of economy which lies entirely within the control of the motorman, the economical use of power.

MOTORMAN HAS A PROFESSION, SAYS MR. SUNDERLAND

Any motorman can, by exercise of sound judgment and good common sense, by interest in his work as well as in his pay, coupled with an insatiable desire to lead in his profession (and it is a profession) save money for his company on every trip, by cutting down to the irreducible minimum the current necessary to maintain the schedule under the rules. The irreducible minimum is an elusive goal; its pursuit is one of the things that takes the monotony out of motormanship, adds zest to the present run and lends enticement to the future run.

There are two electric circuits on each car, the operating and the light circuits. It is the operating circuit that affords the greatest possibilities of saving.

There are at least two positions marked on each controller, "off" and "on." We can save power in both positions. At the carhouse the controller is in "off" position and that is the logical place in which to commence to save. We shall, however, begin with the "on" position. At most carhouses there are peculiar physical characteristics of track or overhead that necessitate limited speed. Shall we open up the controller and go out of the carhouse with a rush, making the car jump at each point until we reach the bad place in track or wire and then throw off and use the emergency brake to slow us down? Hardly; if it is necessary to beat another motorman to the straight-away, the better plan would be to get up a little earlier than he does, and take our own time in getting out. Instead, we shall open the controller one point, then when the car has attained the limit of speed on that point, give it another and another, until we have momentum enough to carry us over the bad place. Then we shall throw off and drift at the required speed. This, of course, applies not only at the carhouse but at many places on the road. At one point on our line we have a sharp grade to climb, then a short stretch of straight track, then a sharp curve. I have found that by throwing off about 50 ft. before reaching the crest of the hill I can

drift around the curve without the use of air—that is, I let the hill do a little of the braking for me.

The rules governing the start from the carhouse, govern every start on the road. Feeding should be done gradually, not too rapidly nor yet too slowly. Whenever we feel the car jumping ahead, we are feeding too fast; that is, if the car is in good working order. Feeding too slowly is a waste of current and accomplishes nothing.

We often have to slow down for a bad stretch of track, a curve, bad wire, crossing another track or "negotiating" a spring switch. In feeding up after such a slow down the controller should be opened up promptly to the point corresponding to the speed of the car—we can tell when the motors begin to work—and from there on the feeding should proceed as from a stop.

If, while the car is standing, a wagon stops on the track 20 ft. ahead of us we must get it off the track before starting. We cannot get by it until it gets out of the way and that 20 ft. of track is expensive to the company if we "inch" over it. Again, starting on a slippery rail is an art. We should feed up very cautiously and slowly, and if spinning takes place we must immediately throw off and feed up again after the wheels stop spinning.

Attempting to start before the brakes are entirely off is expensive, as a rule, but when starting on an up-grade we should feed up just about the time the air is released enough to let the car start forward. We must never let the car start backwards down such a grade. When it is necessary to start after meeting another car it is good practice to feed even more slowly than our own car requires. We must consider the fact that the other motorman is feeding too, with a great pull on the substations. He can only have his share of the current, and there is no necessity for us to try and get the first "bite." Again, the farther the cars are kept apart, the more feed taps there will be between the cars and the less resulting strain there will be on the substations. I understand that substations are an expense in themselves.

In striving to economize with the controller in the "on" position, sparing use should be made of the series running position, which I deem the most expensive point on the controller. It is necessary to use it on long grades, or perhaps to insure a steady running at low speed for a short distance when any other manner of operating the controller would result in a jerky movement of the car, with its resulting discomfort to the passengers. But when we have time to "kill," we should build up to full speed and run, say, a third of the distance, then throw off entirely and finish the remaining two thirds with the controller off.

THIS MAN HAD THE RIGHT IDEA

Years ago I ran with a man who was conductor in the morning. After dinner he was the section boss, fence-gang superintendent, general manager, director and auditor. Of a morning when he had collected the two or three fares, he would come up to me and say "let her float, boy, let her float." And "float" she did. It was up to him to economize and he knew how fast his wattmeter was turning when we were "floating." So we floated and saved. The heavier the car is, the more slowly it will start, and the farther it will drift. A car will not stop immediately the current is cut off (sometimes we have wished it would). I

do not know of a run in which no place can be found to drift, and that without detriment, of course, to the schedule.

Finally, every effort brings its own fitting reward. There is a deal of honest pleasure in climbing down out of the front and walking around the car at the end of a splendid run, and finding "her" cool and in good order. It is then that we realize that no mechanical means can ever take the place of a motorman.

A Dispatcher's View of Car Operation Economics

BY R. E. HARRIS

Trainmaster Michigan Railway, Jackson, Mich.

UPON the train dispatchers, with the assistance of operators, conductors and motormen, depends the prompt movement of railway traffic. The getting of trains over the road with the greatest dispatch consistent with safety is increasingly recognized to be of the greatest importance. Shortage of power, constant demand for cars, congestion in terminals, clamor of shippers and passengers for better service, and keen competition among railroads, electric lines, auto trucks and jitneys, press the dispatching question upon the traffic and transportation departments.

My observation of train dispatching has been through years of experience as conductor, motorman, dispatcher and trainmaster. To my mind, to make a good dispatcher a man should have keen observation, good judgment, steady nerves and the best of memory. He should be slow to anger, but have determination; a man who can think for himself and for others, and above all who is loyal to his company.

Dispatchers should be given more consideration by the managements of electric railroads, because they are a part of the official family and should be given their place as such. To be a good dispatcher a man should be fully informed as to the characteristics of the employees of the road and of the equipment, and he should understand the power conditions. He should obey instructions to the letter and should see that all instructions are obeyed by those under his direction. He should be fully acquainted with the book of rules, tariffs and everything pertaining to the operation of trains. A dispatcher on our electric lines is a sort of a bureau of information.

THE DISPATCHER HAS FIRST-HAND INFORMATION

Most dispatchers' offices have charge of keeping the time of the trainmen. This time-keeping should be given very close consideration. A dispatcher should check the time sheets against the train sheets and be absolutely sure that they are correct before they are sent to the timekeeper's office. When the transportation department plans to make a new schedule the dispatcher's views should be considered because of his knowledge of traffic conditions.

What I have to say should not be considered as a criticism of the work of others, but only as a series of suggestions which have come to me from time to time. In the first place, I note a great waste of energy in power distribution. When we have 600 volts at substations and power houses and down the line a short distance there are but 200 volts, something is wrong with with distribution. When we allow rotaries to run idle for hours we are wasting energy.

Men build power houses, railroads and interurban

equipment which are fine from an artistic as well as a mechanical standpoint; but they sometimes overlook the possibilities and probabilities of breakdowns. Thus the transportation department is unable to maintain its schedules. Show me the company that does not properly maintain its track and tolerates poor distribution of power and I will show you the company that has poor equipment, poor power, discouraged trainmen, unreliable schedules and bad business generally.

Finally, my greatest wonder is why the electric traction companies try to maintain all the conceivable varieties of equipment that they do. Why not cut down the enormous cost of upkeep on the "fifty-seven varieties" of equipment and standardize all of our cars and interurban lines, and run through service from one large city to another?

How the Master Mechanic Looks At It

BY TERENCE SCULLIN

Master Mechanic Cleveland (Ohio) Railway

SCHEDULE, speed, proper equipment for local conditions, proper maintenance of roadbeds, distribution of power, training of trainmen and a co-operative spirit among employees, all play their part in operating economy. From the mechanical standpoint, the handling of the equipment in service is the most important, and overshadows all others. The best efforts of the mechanical department can be "knocked into a cocked hat" in five minutes by carelessness or recklessness.

TRANSPORTATION AND MECHANICAL DEPARTMENTS MUST CO-OPERATE

There are, to my mind, no departments where co-operation is so vital to the general welfare of the company and to good service to the public as between the men who operate the equipment and those who maintain it. Careful operation results in fewer repairs, and careful repairing makes operation pleasant for public and management. The public mind would not be agitated by interruptions in service, and the feeling between public and company would improve under the conditions that should prevail if co-operation could be maintained in practice.

Car operation at excessive speed over track special-work is very irritating to the mechanical department, which realizes the damage that results from the hammer blows that the equipment receives under such conditions. The handling and application of the air-brake equipment should not be overlooked, also, when economies in operation are desired. In general practice on city service, more air is wasted in making one stop than would be required for two if the brakes were applied properly. The application of brakes with power on causes necessarily a waste of power and excessive wear on brakeshoes and wheels.

The proper handling of the controller is another very important factor in economical operation. The notches or operating points were put on these controllers for a purpose. If they are to be ignored the controllers could be constructed much more cheaply than at present. Engineers have prepared tables showing the power saved by the careful handling of the car compared with reckless handling over a given distance, all conditions being equal. This is worked out to show that with the proper application of the power 250 ft. more could be covered with the same amount of energy per stop.

Finally, I wish to emphasize the point that in securing

economical results, the proper training of employees is the most important factor.

A Claim Adjuster's Views on the Subject

BY T. W. GILTNER

Assistant Claim Adjuster

Northern Ohio Traction & Light Company, Akron, Ohio

A CLAIM adjuster has neither cost curves, speed schedules, ampere-hour meters nor saturation point of the motor field to guide him in his work. He must depend upon the uncertainties of the unknown quantity and quality of a jury selected from all classes as his reliable barometer. This is influenced more or less by the cunning of ambulance-chasing attorneys and their cohorts, and of unscrupulous physicians who use the not unwilling claimant as a vehicle by means of which to transfer money from the fare boxes to their own pockets.

Too often the item of claims is classed with general and miscellaneous expense, not of sufficient importance to receive special attention; yet no doubt every one can recall a serious collision or derailment involving great loss of life and serious injury to scores of passengers which resulted in a receivership for the unfortunate company. It is doubtful if either the cost of power, the maintenance of way, the maintenance of equipment or traffic has been the direct cause of such misfortune. In the scope of the claims department, as well as in that of each other branch of electric railway work, may lie that delicately balanced differential which means financial salvation or oblivion. Any plan designed to produce maximum economy in car operation will fall short of its purpose unless accident prevention is continually kept in mind. The cost of a single accident occasioned by an effort to save the interest on the cost of new and needed equipment or by excessive increase in schedule speed may wipe out a year's prospective profit.

QUICK STARTING CAN BE OVERDONE

Mr. Phillips suggested that the most rapid rate of acceleration and braking within the limits of comfort and safety to passengers, and of capacity of the motors, is most economical. Unless the construction of cars leaves a minimum open floor space, and provides for ample supports and opportunities for maintaining the equilibrium of standing passengers in these sudden starts and stops, a heavy loss in the payment of claims is sure to result. It will also prove economical to limit the motor capacity of cars operating in closely built-up districts so as to produce a speed not far in excess of the limit fixed by statute, for every attorney alleges in his petition "a high, excessive and dangerous rate of speed," an allegation most difficult to combat. It is an accepted fact that the number of accidents will increase or decrease in direct ratio to the increase or decrease of the speed schedule, provided no greater skill in operation accompanies the increase. The cost of accidents will likewise rise and fall with the changing condition of the rolling-stock, roadway, overhead construction, etc. Maximum economy in the claims department will be secured by spending large sums for good cars, for good roadbed, for good overhead construction and for efficient supervision of all.

The number of alighting and boarding accidents will vary in proportion to the number of stops and the skip-stop plan should, therefore, be carefully considered. To eliminate a stop removes one potential danger. Oppor-

tunity for time saving at loading points should be provided by the use of wide doors entered by means of a low step. Approximately 75 per cent of the total number of accidents occurring on electric lines traversing thickly populated districts are collisions with vehicles. A plan for economy in car operation should involve a survey of the entire system to determine where the greatest number of accidents are concerned. This should be followed up with remedial measures, which may include slow orders, safety stops and instructions to platform men, together with co-operation of those who regulate the vehicle traffic. A large map of the system on soft wood, with pins having differently colored heads to represent the different types of accidents will prove useful. When a number of pins appear at the same point, showing derailments for instance, this information can be given to the maintenance-of-way department, which would naturally take the necessary remedial measures.

There is no other factor as important in the prevention of accidents as the efficiency of car crews. The most economical route is through training schools conducted by a claims-department man who knows his work, in which talks are given to the platform men at meetings arranged for their convenience and attended by the heads of departments, superintendents, dispatchers and officials who take this opportunity to get closer to their men. These talks on accidents should occur not less frequently than once every six months.

To most of the men an accident is a closed incident when they have signed their accident reports; but it is their nature to want to learn, and if the opportunity is given they will learn and this will show in reduction of accidents.

The old story of locking the stable door after the horse is stolen is covered with moss, it is true, but it is a good introduction to the last point to be considered, namely, frequent and thorough inspection of all equipment and construction. Any plan designed to produce maximum economy in car operation in which a place is not given to careful inspection of roadway, power plants, underground and overhead construction, equipment and traffic conditions; and which does not provide for the selection of platform men with great care and for their careful training, will find that out through the claims department has gone the revenue which should have swung that delicately balanced differential toward financial salvation.

The Superintendent's Viewpoint

BY O. G. SNELL

Superintendent Union Traction Company of Indiana, Anderson, Ind.

IF THE interurban transportation industry is to be established on a business basis, systematic and efficient operation in every detail is absolutely necessary. It is impossible in this day of rapid industrial growth to handle enormous increases in business with old equipment and ancient methods. It is doubtful whether the close of the war is going to restore normal conditions in transportation, and even if approximately the old conditions should be brought back it will not be easy for us to recover from the severe financial distress of the present time.

The railway business is not what it used to be. Since the advent of myriads of automobiles, a city or community can get along for a few days in a lame sort of way without railway service. Increases in unit fares and freight rates, and shortened fare zones, have a tendency

to stimulate competition to make further inroads upon our traffic. This forecasts a radical change in the nature of the city or interurban railway as a public utility and in the character of service it may render. Drastic remedies, such as the operation of one-man cars with the track layouts required on a more frequent headway on city lines, must be applied; these cars to be equipped with registering fare boxes and modern motor equipment. I refer particularly to service in cities of less than 50,000 population. In the larger cities some districts or lines will not permit of such service, and cars of the pay-as-you-enter or pay-as-you-leave type, with ample vestibule room, will be needed to maintain a frequent and fast service through densely populated sections. Traffic surveys at frequent intervals on interurban lines to determine peak-hour loads, canvasses if necessary to secure public opinion as to what service will accommodate the majority, and other means for improving service must be employed. As conducting transportation involves about 50 per cent of the operating expense of an electric railway this department is important from the standpoint of economy.

The experienced platform man who has made a careful study of his duties can be an important factor in economy of operation, since his experience may at some critical moment cause service to be maintained under conditions that would cause a new man to fail completely. Most men are willing to be taught, and here lies a wide field for economic and efficient teaching of the many phases of the economics of car operation.

METERS KEEP SHOP MEN "ON THEIR TOES"

On the subject of power for operating cars, the writer has had some experience with ampere-hour meters installed on cars to promote energy saving. He found that the men appreciated that careful attention to power saving goes hand-in-hand with greater safety to themselves and their patrons. For example, if a car showed signs that the brakes were too tight or the car dragged for any other reason, the men asked to have the trouble corrected in order to keep the average power saving record high. Such an attitude on the part of platform men tends to keep the shop men on the alert to see that no car goes into service unless in good operating condition.

Besides improving the energy-saving record, the meters had a further value in showing that the motormen who made the best energy records were as a rule the ones who were previously considered the best. In other words, the man who was alert and keen in his efforts to save power was found to be always on the lookout to avoid accidents. In promoting better driving of the car, the meters helped in saving the equipment and effected a reduction in accidents.

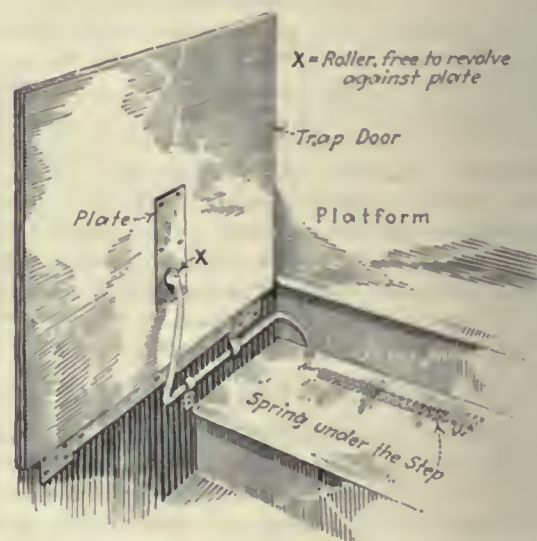
Another factor in economy is good maintenance, and the operating department has a real task to perform if a dependable service is to be maintained. The system of inspection on many city and interurban railways has not yet reached the steam-road standard of efficiency. On the steam roads, at all terminals and certain stations where trains stop even for a few minutes, one finds the car inspector, with hammer and can of oil, making a close inspection of the condition of journals and trucks. He is in many cases able at once to remedy a condition that would otherwise have caused a bad tie-up of the train.

An effective system of shop inspection, whereby cars are placed in service only after they have been thoroughly inspected for mechanical or electrical defects or

repairs and for cleanliness of interior as well as the exterior, will go a long way to satisfy the patrons of the road. In these days of strenuous competition and keyed-up efforts to maintain a dependable service, any failure of equipment to perform the duties intended will cause criticism of the personnel or policy of the company. No passenger will be satisfied with the service if the car has a dusty and unclean interior, the windows a coating of dust or a toilet in condition that could have been eliminated by a system of inspection at the shops.

Spring-Operated Trapdoor Lift

THE accompanying illustration shows a spring-operated trap door lift which has been in satisfactory service on the cars of the Philadelphia & Western Railway for the past few years. It was designed by Rowland Hubbard, master mechanic of that road. The trapdoor, hinged in the usual manner, is operated by means of a bell-crank lever offset to provide for bearings. This lever is made of $\frac{3}{4}$ -in. mild steel and the portion which passes through the car step is 5 in. long, the bearing portion 12 in. long and the long outside portion 18 in. long. This longer end has a larger piece of iron forged on, which is upset



APPLICATION OF TRAPDOOR LIFT TO CAR PLATFORM

and slotted to provide for a roller $\frac{3}{4}$ in. long by 1 in. in diameter. The roller is of mild steel, case-hardened, and it operates on a wearing plate fastened to the under side of the trapdoor. The wearing plate is made of iron $\frac{1}{2}$ in. x 2 in. x 12 in. A long tension spring made from an old brake-release spring is attached to the short end of the bell-crank lever and provides the necessary tension for raising the door when it is released. This short end of the bell-crank lever passes through the upper car step and the spring is hooked over the end of this. The other end of the spring is hooked to a right-angle bracket fastened to the under side of this step. Two flat-iron straps, $\frac{1}{2}$ in. x 1 in., form the bearings for the bell-crank lever. These are bent around a piece of $\frac{3}{4}$ -in. stock, drilled to $\frac{1}{4}$ in. and then split in two parts to provide for convenient attachment. In ordinary operation the trapdoor is latched down. Unlatching is all that is necessary in raising it, as the spring action through the bell-crank lever raises the door to its proper position. This type of lift can be made up at very small expense and will operate both steel and wooden trapdoors.

Economies in Steam Generating Stations^{*}

The Author Shows Particularly How Labor Saving Can Be Accomplished
Between the Coal Car and the Ash Dump — He Does Not
Favor the Bonus System

By S. M. FINN

American Engineering Company, Boston, Mass.

AT NO TIME and in no other industry has there been such an awakened interest in the subject of economic operation as there is at present among power-plant engineers. This is a natural aftermath of the war. It is made necessary among other things by the scarcity, high price and general inefficiency of labor.

Economies in the power-plant field fall into three well-defined classes, namely, (1) labor, (2) maintenance of equipment and (3) conservation of natural and generated energy and lubricants. Labor saving is effected by the geographical location of the plant, the design of the plant and the selection of equipment made with a view to eliminating labor and extensive repairs. Saving in maintenance depends on proper selection of equipment from the standpoint of maintenance and proper selection of operators. Saving in the third class mentioned depends, first, on the proper selection of equipment, second, on the selection of the operators and, third, on the checking up of performance.

From the above it is evident that proper selection of equipment occurs in all three classes of savings to be effected, and this in general is the most important source of economy available. This paper is devoted mostly to the equipment end of the subject. Before taking up this topic, however, a few words on the others will be in order.

In these abnormal financial times, common labor is being paid out of all proportion to ability as compared with operating engineers and experienced technicians. In such an emergency as that through which this country is passing, muscle predominates for the time being at the expense of brains, but in the past in every case muscle has gone back somewhere near its previous level, while brains have permanently remained uppermost. The great body of workers who constitute the middle class between labor and capital should, therefore, remain the conservative, constant class, counteracting any radical tendency on the part of either labor or capital.

As to the human element in labor, results along this line can only be secured through the personality of the foreman, through his willingness to put aside his personal ideas in order to adopt an attitude which his analysis of the situation says is correct. Bonus systems have been worked out in some plants for increasing efficiency of firemen. In most of these it is possible to manipulate the results, breeding dishonesty in those who are clever enough to do so and dissatisfaction among the others. The only fair bonus system is one based on punctuality and attendance, but even this has the effect of under-rating the common rules of success in the minds of the men.

As to the effect of geographical location as a source of economy, the plant of the Northern Ohio Traction &

Light Company at Cuyahoga Falls may be cited as an example. This is built on an alluvial deposit between the base of a high cliff and a small river. The face of the cliff forms the back of the power plant, the waters of the creek washing the foundation in the front. Elements of economy here are found in the short distance through which it is necessary to handle the condensing and circulating water; in building construction due to the use of the cliff for one wall, but most of all in the use made of the location in connection with coal handling. A railroad track runs parallel to the creek, and it is possible for coal cars to be run off from the cliff on a level grade on top of the power plant. The coal is dumped into track hoppers, from which it passes down to the coal bunkers, then through the stokers, which have continuous rotary dumps, and into the ash hopper. Coal is not handled by man or machinery until it has been reduced to ashes. There are few such ideal locations to be had in this country, but on the other hand the advantage of locating the power plant at tidewater is utilized in many plants, such as, for example, the "Waterside Station" of the New York Edison Company. The real benefit derived from waterfront power station location must, however, be credited to the ingenuity of the conveyor engineer rather than to the location of the plant.

SOME PRINCIPLES OF ECONOMICAL COAL HANDLING

Coming now to the subject of equipment, it seems best to consider this with all three possible sources of economy simultaneously in mind.

Power generation starts at the unloading of the fuel container, whether it be a coal car or a tank for fuel oil, and at this point economy must start. Unloading of cars by hand requires much labor, and involves appreciable loss of fuel. There is probably not a plant in the country which could not build an elevated siding up which the cars could be run and dumped into a track hopper. If coal is stored on a plot of ground, there is the problem of getting the coal into the boiler room. Although still used, the wheelbarrow is an antiquated device for moving this, although there are old plants in which it would not be practicable to install overhead conveying systems. For these the electric tractor offers an ideal solution. In some plants very elaborate coal-handling equipment is feasible. Locomotive cranes are frequently used for unloading and piling coal in storage cars and are very economical for this purpose.

In the boiler room there are excellent opportunities for coal-handling equipment. One method which is particularly useful, when stokers with hoppers of ample size are installed, is the use of a traveling lorry, either on telfer rail or on a double track. The great advantage of the monorail or telfer system is the ease with which a track can be run out into the storage yards;

^{*}Abstract of paper read before the New England Street Railway Club, Boston, Dec. 4, 1919.

as there is but one rail or track. This can twist and turn around on existing building structure, and the monorail lends itself particularly well to plants which are being rehabilitated. The use of the double-track traveling lorry is restricted to straight-line operation or to curve of long radius. It usually has the advantage of including a weighing scale and can be installed and built much lighter than the monorail crane, particularly when the operator walks on the ground. It is always necessary to have coal overhead in using this type of lorry, whereas the monorail system can be equipped with a grab bucket, either of the clamshell or orange-peel type, and can have the operator in the cage. The latter plan, therefore, is efficient for handling coal from the yard directly to the boilers.

COST OF MAINTENANCE NOT A FACTOR

The installation of an efficient coal-handling system is surely one of labor saving; and as far as maintenance is concerned, there is very little choice among the several systems outlined. I make this statement because in the case of the bucket conveyor, where the maintenance would naturally be higher than that of an electric tractor, the size of the plant which would warrant the installation of a bucket conveyor would not warrant the installation of a tractor. Therefore, the upkeep per ton of coal handled would be about the same in both cases, provided of course that the best design and construction of mechanism in each case were selected.

In connection with the coal-handling equipment a very important auxiliary is a coal-measuring device. An automatic recording coal scale has a psychological effect upon the average fireman. The non-automatic recording coal scale has the effect of making the fireman dishonest in his endeavor to show low fuel consumption. The scales are usually located at the top of the downcomers to the boilers.

A large item of conservation of coal is in the selection of stoker and boiler. Although for short periods, under special conditions, results equal to those possible with mechanical stokers can be secured by hand firing; this method does not belong to the modern power plant. A consideration of the construction of a modern underfeed stoker will show why this is so. For example, in the later type of Taylor stoker the power dump feature has been incorporated, and the cleaning of the bridge wall is accomplished by mechanical means. This is done, the plates are dumped and the plates are returned to their normal condition in about twenty seconds. This feature eliminates smoke due to cold air coming up through the side door while the clinker is being broken from the bridge wall; it eliminates the necessity for an air-tight ash pit and also saves labor. An even later improvement is the rotary ash-discharge type of stoker, in which the crusher rolls revolve continuously with a speed proportionate to the speed of the coal feed.

Modern devices of this sort not only produce labor saving, but increase efficiency. For example, in one plant which has a varying load factor of from 15 to 85 per cent an average monthly over-all efficiency of boiler and stoker of from 72½ to 74 per cent is maintained. This includes all standby losses, and at times these efficiencies have been obtained with coal running as high as 20 per cent in ash. The plant uses Taylor power dumps and Edge Moor watertube boilers.

The boiler question is largely a matter of personal opinion of the engineers. The writer has found very

little difference in efficiency as obtained with the various types of boiler. The design of the setting is very important, however, and a large combustion space with the stoker set flush with the front of the boiler is important. Vertical and inclined baffles are considered superior to horizontal baffles hanging from or laid on the tubes. The building of superheaters in the gas passes of the boiler setting proper is preferred by engineers to location in a separate compartment. Soot cleaners are necessary, and one permanently built in place is preferable to the old steam lance.

Ash disposal, and with this may be included soot disposal, is a very important item in the power plant, but until recently it has not had proper consideration. The bucket conveyor should not be used in handling ashes, not because it is not a good conveyor but because rolling contacts wear excessively in the presence of abrasive material. One of the best methods of handling ashes is the old-fashioned wheelbarrow method, condemned for every other modern use. Of course, in this the actual wheelbarrows are not used, but the same principle is applied, namely, the ashes are dumped or raked into cars. As an example of good ash-handling practice, that used in the Long Island City power plant of the Pennsylvania Railroad may be mentioned. Here the ashes from thirty-two 600-hp. boilers are handled by dumping into iron tanks which are carried on flat trucks pushed by hand to a hoist. This lifts the tanks without the truck up to a runway, where they are carried on other cars out to the ash tower. The use of electric tractors or endless cable has also been adopted successfully for handling ash cars. The storage battery drive should, of course, not be put directly on the ash car. Bell conveyors are not successful in handling ashes.

A modern type of conveyor that lends itself particularly well to the handling of ashes is the so-called vacuum conveyor. The system that sucks the ashes is preferable to the one that drives them, because suction tends to draw the particles of ash to the center of the pipe, producing the minimum wear on the pipe itself. A combination of the two methods is probably the best, namely, suction on the horizontal line and forcing on the vertical line. Much ingenuity has been exercised in designing the elbows of these conveyor pipes, so that the pipes that are subject to excessive wear are easily replaced.

The low cost of operating one of these conveyors is surprising. By actual test made by a company not selling ash conveyors, it was found that the steam consumption was but a very small fraction of 1 per cent of the steam generated.

ANOTHER BROAD FIELD FOR SAVING IS SUGGESTED

The proper selection of auxiliary equipment, both for the generators and for the boiler of the power plant is very important. The rotary circulating pump driven by an electric motor is far more economical than a reciprocating pump. The modern high-speed fan driven through reducing gears by a high-speed turbine gives forced or induced draft at a much lower cost both for operation and maintenance than the old paddle-wheel fan. The steam consumption for stoker auxiliaries should never exceed 2½ per cent of the steam generated when exhausted into the atmosphere, and actual tests show the figure to be as low as three-fourths of 1 per cent, when the steam is returned to a heater. Modern bucket conveyors are operated by motors ranging from 5 to 20 hp.

Experiences with Thermit Insert Welding at Southampton

BY W. TUKE ROBSON

General Manager and Engineer, Southampton Corporation Tramways, 1915-1919

SOUTHAMPTON was one of the first English towns to adopt Thermit welding, and as long ago as 1906 this process was used in relaying the track on the fine thoroughfare known as Southampton Avenue, one of the finest roadways in any British town and of which the inhabitants are justly proud. The present process



SOUTHAMPTON AVENUE WHERE THE JOINTS WERE INSTALLED

followed in America of insert or wedge welding was then quite unknown, and the joints were welded in the usual British way by drawing the ends of the rails together by means of a large clamp, this clamp not being released until the weld had cooled off.

Owing, however, to the existence of fishplate holes, fractures afterward occurred, and the writer upon taking up his duties was met by the serious position of finding the main thoroughfare of the town spoiled by a series of badly knocking joints. The Thermit Company at that time was experimenting with the pressure weld now so universally known in America, and after much consideration, it was decided to make a clean sweep of the trouble, and the defective joints were cut out, an insert piece 18-in. long of equally worn rail being substituted.

The double joints thus made were then forced apart by wedges, and the outer rails held by a specially designed clamp, which in addition to maintaining the expansion was also provided with a heavy square threaded thrust screw.

The wedges were then replaced by copper-covered inserts, known as "shims," $\frac{1}{8}$ in. thick, which were thrust into position by this screw. The clamp was then removed and two Thermit welds were made in the usual manner.

This departure from existing standard practice was fully justified by the results, as not one of the joints welded in this way in 1915 has since failed and Southampton's fine avenue now enjoys a quiet, perfectly-welded track.

This success naturally led to further experiments, and other portions of the system were dealt with. It was soon found that ordinary fishplate joints could be successfully treated by pressure welding, as the presence of fishplate holes in rail ends did not lead to fracture when the rails were forced apart, although fatal when the opposite practice of drawing together was used, and a considerable length of track marked down for renewal just before the war was saved for a further indefinite period by similar treatment.

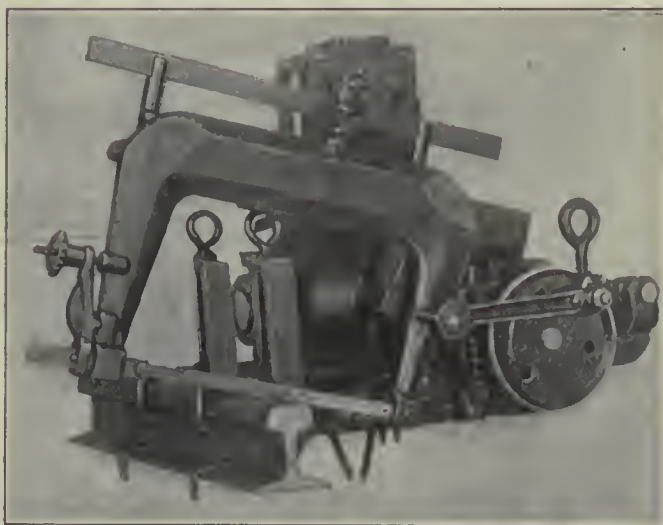
The impossibility of obtaining either new rails or labor during the period of the war actually made such a process very welcome, and although the adoption of electric welding of dished or cupped joints proved to be much cheaper than the Thermit process for minor repairs, the latter has its own particular uses, especially in cases of fracture of the rail itself, when the insertion of a short length of rail provides the only satisfactory solution.

Cutting Rails with a Power Sawing Machine

A NEW TYPE of portable rail sawing machines has recently been placed on the market by the Racine Tool & Machine Company, Racine, Wis. The machine is furnished complete with motor and starting box, and the frame and body are of steel castings to insure against breaking.

An interpole, ball-bearing, fully-inclosed type of motor is supplied for driving the machine, which will operate on direct current of from 260 to 600 volts. When used by electric railways, current may be taken directly from the trolley wire or the third-rail. The motor is mounted on the frame of the machine and the drive is through worm gearing. The weight of the machine complete with motor and starting box is 225 lb.

Quick-acting clamping devices allow the machine to be easily placed at work, and the clamps may be readily



POWER SAWING MACHINE FOR CUTTING RAILS

adjusted to fit any size of rail within range of the machine. The length of stroke is 6 in., and the number of strokes per minute is sixty. It is claimed that this machine will cut a 9-in. girder rail in from fifteen to eighteen minutes, and that one blade will cut from eight to ten rails. The saw clears the work automatically on the return stroke.

Association News

Special Car New York to Cleveland

FOR the benefit of New York members who are going to the mid-year meeting to be held in Cleveland on Jan. 8, there will be a special car attached to the 6.45 p. m. train leaving Grand Central Terminal on Jan. 7. The railroad fare is \$20.16, lower berths are \$3.24 each, uppers are \$2.59, and the one drawing room holding two or three is \$10.80. Applications should be made to association headquarters at once.

Activities of Information Bureau

THE information bureau, through Special Engineer J. W. Welsh, announces the completion of ten bulletins on timely subjects.

Two bulletins relate to trainmen. No. 122 contains information from 288 companies covering rates of wages paid for each year of employment, together with the dates on which the present scale became effective. No. 123 covers working conditions of trainmen employed by 237 companies, and gives the information regarding the number of hours constituting a day's work, the limitations as to the spread of runs, the proportion of straight and swing runs, the rates paid for overtime and the basis on which overtime is calculated, together with any guarantees covering minimum wages for men employed. As this is a confidential compilation, the companies are referred to only by key numbers.

An up-to-date tabulation has also been prepared covering cities that have increased the rates of fare. This gives both the new and former fares, cash and reduced-rate tickets and the effective dates. A comparison of valuation and capitalization of twenty-three typical electric railways shows an excess of capitalization or valuation for the group of approximately 11 per cent. This bulletin contains a brief summary of the valuations, the authorities making the studies and the sources of information.

A study has also been made of the cost of money for public utilities in a compilation of securities issued since Jan. 1, 1919. This shows the kinds of securities, the actual yields to the investors and the nature of collateral back of the securities. A study has also been made of the rate of return allowed in numerous decisions of public utility commissions, as well as by other public authorities. It deals solely with electric railway properties, and includes a summary of the rates of return fixed in service-at-cost franchises.

Another bulletin covers the cost of motor-bus operation. This includes summaries of financial statements of a number of prominent motor-bus companies, together with descriptions of the operating equipment, and a general statement of the operating conditions in the territory served by the buses. The tabulation also includes a summary showing the cost of operation of the Post-Office Department's motor-wagon service, as well as information covering the cost of operating a number of different types and sizes of motor buses.

The remaining bulletins relate to jitney regulations, metal tickets and fares. The first is a summary of public service commission decisions in several states and a compilation of statements in the technical press from

Program for the Mid-Year Meeting

CLEVELAND, OHIO, JAN. 8, 1920

MORNING SESSION

- I. Report of Committee on Changes in Constitution and By-Laws providing for increase in dues of members, to be presented by L. S. Storrs, chairman.
- II. Presentation of the following resolution regarding depreciation:

Resolved, that the American Electric Railway Association recommend to its member companies that they provide in their accounting practice for the creation of adequate reserves to insure the replacement or abandonment of major items of property in advance of their actual replacement or abandonment; that such reserve shall, if possible, be provided for in cost of service franchises; and further that this subject be referred to an appropriate joint committee of the American Electric Railway Accountants' Association and American Electric Railway Engineering Association, to formulate report on the preferable means of creating such replacement reserve and the variations in the amount thereof that will occur in railway properties of different characteristics; and further

Resolved, that a summary of such report be presented to the American Electric Railway Association at its annual convention in 1920.

The foregoing resolution will be discussed by Williston Fish, vice-president West Penn Railways, Pittsburgh, Pa., who will present a paper supporting it, after which there will be general discussion of the resolution.

AFTERNOON SESSION

- III. Paper: What a Labor Contract Should Contain
EDWIN GRUHL—Assistant to President,
North American Company, New York.

General Discussion.

- IV. Discussion of the Desirability of the Association Holding More Frequent Conferences.

THE BANQUET

Richard McCulloch, first vice-president of the association, will preside at the banquet to be held in the Hollenden ballroom at 7 p.m.

The speakers will be:

- Hon. Warren H. Harding, United States Senator from Ohio;
- E. A. Guest, of the Detroit (Mich.) *Free Press*, and Andrew Squire, General Counsel Cleveland Railway.

April, 1918, to Dec. 3, 1919. The second is a partial list of companies using metal tickets, together with references from the *ELECTRIC RAILWAY JOURNAL* and *Aera*, to Dec. 9, 1919. The fare bulletin relates to rates in Canadian cities, showing authority granting rate, name of company operating, former rate of fare, date on which increase became effective, and population served.

Electric railway companies which are members of the association, can obtain copies of these bulletins by application to the information bureau.

Manila Section Temporarily Suspends

OWING to labor conditions on the property of the Manila Electric Railroad & Light Company, it has been found expedient not to hold meetings of the company section for the present. The men who have been active in conducting the work of this highly successful section hope that it may be possible to resume the work at an early date.

Toledo Section Still On the Map

OWING to the recent disturbances in the electric railway situation in Toledo, Ohio, the local company section was quiet for a time, but activities have been resumed. Its Christmas party was held on Dec. 23, with music by the section orchestra and the section glee club, as well as a motion picture entertainment. An old-fashioned Christmas tree with distribution of presents for the children rounded out the program. The last section dance was held on Nov. 5, just before the cars of the Toledo Railways & Light Company went "on vacation," but the dances will be resumed on Jan. 7. There will also be a "stag party" and smoker on Jan. 30.

Fare Boxes Settle the Arguments

THE Galveston (Tex.) Electric Company recently installed Johnson fare boxes on the local street cars, and at the time of this writing had had two weeks experience with them. The result is that the public, company and employees seem to be well satisfied. The company is pleased not only because of the usual results from fare box installations, but because the new practice of pay-as-you-enter collection has eliminated one source of many arguments between the conductors and strangers in the city. The pay-enter system is so generally prevalent that most strangers boarding the cars tender the conductor their nickel as they enter. The conductors have had a habit of refusing to take the coin at that time, apparently because of some mental process of keeping track of who has and who has not paid by his position in the car, or for some reason. Arguments have followed. But the fare box solves this situation and the people like the freedom from the frequent trips of the conductor through the car.

All of the closed cars operated by the company are single truck with small vestibules. The fare boxes were mounted on the far door post of the bulkhead without any change in the vestibule. The adoption of fare boxes was somewhat complicated by the use in summer of a large number of cross-seat open cars on which the boxes of course cannot be used. These cars are very popular with the riders, so that it is desirable to continue their use. So the practice in summer will be mixed, pay-enter on the closed type cars and pay-within on the summer cars.

Letters to the Editors

Zone Fares for Small Cities

BROOKLYN, N. Y., Dec. 21, 1919.

To the Editors:

In these parlous days when American experiments with the zone fare are in their early stages, and therefore with few friends and far between, it is good to have so enthusiastic an article as that which J. A. Emery contributed to your issue of Oct. 4 on "The Future Fare System for Small Cities." While others question the value of the zone-fare principle for urban communities of any size, Mr. Emery goes as far as is at all practicable by suggesting a zone fare for cities of less than 100,000 population.

In general, I am fully in accord with him that where the differential fare is introduced in such cities in combination with the modern one-man car—and the latter can be made more important than the fare system—there should be no practical difficulty in the collection of fares "by the use of colored tickets with prepayment inbound, and postpayment outbound."

For all that, I believe it would be unwise to make any sweeping generalizations on this question of zone fares for cities under 100,000. In the examination of particular communities, we are likely to find that some other scheme is demanded by the necessities of the case. For example: There is a city of 50,000 with the business and shopping district located along a body of water with the car routes extending south, north and west from this area for distances of 2 to 2½ miles. Owing to the present long intervals between cars, at least half the population are not prospective customers for the street railway except in bad weather, and a large portion of the other half could easily walk pretty deeply into the inner or first zone before a car comes along, assuming that the prospective passenger had just missed the preceding car.

Under circumstances like these people in the inner zone will not be tempted by a short-ride fare, for the obvious reason that the cars do not come along often enough to save their time. Very close headways are required to build up riding in such areas. In practice, we generally find that two or more lines converge in the downtown section so that it is possible to offer a car in this section every two or three minutes if the converging lines themselves have something better than fifteen and twenty-minute intervals. Granted this condition, we may be assured that we have the first requisite for maximum riding, namely, frequent service.

It must also be clear that so long as people in the outer zone depend upon long-interval cars they will almost always walk to and from the boundary of the first zone. Give them a five-minute service, and such practice would be reduced to negligible proportions.

From the studies in small cities that I have been privileged to make here recently, it seems to me that the first essential for reducing expense and gaining more revenue is to operate more economical cars and a greater number of them. This means the automatic or safety car. After the resources of such frequent-service cars

have been exhausted, it is in order to see what can be done with differential fares, particularly in building pick-up traffic.

In passing, I would also like to point out that we cannot form wholly satisfactory deductions as to what a zone fare would do for large cities if we base those deductions on the traffic characteristics developed under a flat-fare system. The tendency of a zone fare in combination with frequent service is to develop off-peak, short-haul riding, which in turn leads to the growth of more neighborhood centers. For the public welfare this consequence is desirable, because it is largely through neighborhood centers that we can foster that civic pride so lacking in big American cities to-day.

WALTER JACKSON.

Police Power Reserved to Cities

Supreme Court Will Interfere Only Where Power Is Exercised in a Clearly Arbitrary and Oppressive Manner

THE United States Supreme Court handed down on Dec. 15 a decision in the Shreveport (La.) "one-man car" case, upholding the right of the city, under its police power, to insist on the use of two men. While the court did not deny its right, under certain circumstances, to interfere with the "exercise of the power reposed by law in municipal corporations for the protection of local rights and the health and welfare of the people in the community," such interference, it declares, should take place only "in cases in which the power has been exercised in a manner clearly arbitrary and oppressive." The decision, delivered by Justice Clark, follows:

THE DECISION IN FULL

In 1907 the City of Shreveport, La., passed an ordinance requiring that each street car used in its streets should be operated during designated hours by two persons, a conductor and a motorman, and providing penalties for its violation. The company with street railway lines in the city complied with the requirements until in June, 1917, when it procured some cars equipped for operation by one man, and attempted to use them on its "Allendale Line," with only a motorman in charge. Thereupon the plaintiff in error, hereinafter designated the defendant, who was superintendent of the railway company, was arrested for violation of the ordinance.

He defended by filing a motion to quash the affidavit for arrest, on the ground that the ordinance was unreasonable and arbitrary and that the enforcement of it would deprive the company of its property without due process of law and without compensation, in violation of the Fourteenth Amendment to the Constitution of the United States. The motion to quash was "referred to the merits," a full trial was had, the motion was overruled and the defendant, found guilty, was sentenced to pay a fine. The judgment of the Supreme Court of Louisiana affirming this judgment is before us for review on writ of error.

The defense introduced evidence tending to show that the new type of car used was so equipped that it could be operated by one motorman with safety to the public as great as was secured by cars theretofore used when operated by two men. The car, designated in the record as "a one-man car," is described as so arranged that passengers enter and leave it only at the front end, where the motorman is placed. It is so equipped electrically that the motorman must remain in an assigned position necessary for the discharge of his duties and must perform "some conscious act" at all times when the car is in motion. If he fails in this "conscious act" the current is automatically cut off, the brakes are applied in emergency, the rail is sanded and the door of the car is unlocked and is so adjusted that opening it lowers the step for use. There is testimony tending to show economy in the use of such cars, not only in the saving of the wages of one man but also in immunity from accident.

It is apparent from this description derived from the record that it presents for decision the question: Whether

the ordinance of 1907, confessedly a valid exercise of the police power when it was passed, was rendered arbitrary and invalid by the development of a car which it is claimed can be operated by one man with as much safety to the traveling public as, and with less cost than, was secured by the two-man car, in use at the time the ordinance was passed and which was contemplated by it.

It is not necessary to decide in this case whether a valid regulating ordinance can be rendered invalid by a change of conditions which render it arbitrary and confiscatory (Lincoln Gas & Electric Light Co. v. Lincoln, 250 U. S. 256, 269; Minnesota Rate Cases, 230 U. S. 352, 473; Johnson v. Gearlds, 234 U. S. 422, 426; Perrin v. United States, 232 U. S. 478, 481; Municipal Gas Co. v. Public Service Commission, 225 N. Y. 89, 95, 97, and Castle v. Mason, 91 Ohio St. 296, 303), for the claim that such a change of condition had arisen in the case is stoutly disputed by the city authorities.

While on the record before us it might be plausibly contended that when all the appliances on the "one-man car" work as it was intended they should, it could be operated with a high degree of safety in streets where the traffic is not heavy, yet there is evidence that in the short period of the operation of such cars in Shreveport, the brakes on one of them failed to operate on a descending grade, resulting in the car getting out of control under conditions, which, except for good fortune, might have resulted in serious accident. A passenger testified to receiving slight injuries when entering a car due to the premature closing of the door, and he attributed the accident to the presence of other persons between him and the motorman whose duty it was to close the door. It was in evidence that the line on which these cars were placed, while in general one of light travel, extended into the principal business section of a city of 40,000 inhabitants; that it had at least one steep grade in it, and that at times the travel was heavy and the cars crowded.

It is obvious, and not disputed, that such cars are better adapted to light than to heavy travel, for all passengers must enter and leave at one door, and one man must take fares, make change, issue transfers, answer questions and also remain in position to start the car promptly. So occupied and placed, plainly this one man could not render such assistance as is often necessary to infirm or crippled, or very young passengers, or to those encumbered with baggage or bundles, and it would not be difficult to suggest emergencies of storm or accident in which a second man might be of first importance to the safety and comfort of passengers.

These "one-man cars" at the time of trial were, as yet, experimental, and enough has been said to show that in each community the operation of street cars presents such special problems—due to the extent and character of the travel, to grades and other conditions—that with peculiar appropriateness they have been committed by the law primarily to the disposition of the local authorities, whose determination will not be disturbed by the courts, except in cases in which the power has been exercised in a manner clearly arbitrary and oppressive. The rule is, "that every intentment is to be made in favor of the lawfulness of the exercise of municipal power, making regulations to promote the public health and safety, and that it is not the province of the courts, except in clear cases, to interfere with the exercise of the power reposed by law in municipal corporations for the protection of local rights and the health and welfare of the people in the community." *Dobbins v. Los Angeles*, 195 U. S. 223, 235. Since the record, as we have thus discussed it, fails to show a clear case of arbitrary conduct on the part of the local authorities, the judgment of the Supreme Court of Louisiana is affirmed.

Safety Code Conference in Washington

A CONFERENCE of representatives of interested organizations was held in Washington recently with a view to formulating uniform safety standards. The conference voted unanimously to approve the plan formulating such standards under the general auspices of the American Engineering Standards Committee. To expedite early action a general advisory committee will be formed to survey the whole field of safety standards and recommend what standards should be undertaken first and what organization should sponsor them. A meeting of the committee will probably be held during January, 1920.

Bulletin News Page

Summary of the Principal Happenings of the Industry of Current Interest Since the Last Issue of This Paper Was Published

PRINTED DECEMBER 26, 1919

The City & Suburban Railroad, Brunswick, Ga., has gone into the hands of a receiver.

The committee representing the holders of the collateral trust gold 4 per cent bonds of the International Traction Company, interest on which was in default, has purchased at foreclosure sale collateral which had been deposited with the Guaranty Trust Company as trustee.

For the year ended June 30, 1919, the Interborough Rapid Transit Company, New York, N. Y., went behind \$8,473,098. Officers of the company see no hope of escape from receivership unless an increase in fare is permitted.

Twenty-six million forty-six thousand seven hundred and sixty-four dollars is the reproduction cost new as of Dec. 31, 1919, found by the Railroad Commission of California for the Los Angeles Railway Corporation. The commission has suggested \$720,000 a year as a depreciation allowance.

President Kealy of the Kansas City (Mo.) Railways believes the company has passed over most of the roughest spots. A letter from him to the holders of the company's funded obligations reviews the recent operations of the company.

Arthur Gaboury has been elected president of the Canadian Electric Railway Association.

The Kansas City (Mo.) Railways is now charging 8-cent cash fares.

The City Council of Salem, Mass., has voted to revoke permits for the operation of jitneys within the city limits.

The Nashville Railway & Light Company, Nashville, Tenn., has applied to the State Public Utilities Commission for an increase in fare to 7 cents.

The United Railways & Electric Company, Baltimore, Md., will reroute its lines with a view to the ultimate establishment of a rapid-transit system.

Judge George W. Kelly of the District Court has dismissed the case of the town of Whitman (Mass.) against four jitney operators.

A zone system with a 5-cent fare in each zone has gone into effect on the lines of the Worcester (Mass.) Consolidated Street Railway.

The Supreme Court of Illinois has handed down a decision sustaining the action of the State Public Utilities Commission in raising fares of the Quincy Railway to 7 cents.

John A. Beeler, traffic engineer, has made the first of his recommendations with regard to traffic conditions in Kansas City, Mo. Mr. Beeler's suggestions will be tried out on Twelfth Street, Kansas City.

The Birmingham Railway, Light & Power Company, Birmingham, Ala., has purchased twenty-five one-man cars with which it will experiment with a view to working out the best plan for the segregation of the races.

Claims so far presented growing out of the wreck on the Brooklyn Rapid Transit System about a year ago aggregate \$1,200,000.

A system of buses is proposed for Philadelphia.

Mayor Thompson of Chicago has named the board to prepare a transportation plan for Chicago.

The City of Seattle, Wash., proposes to take over more electric lines which are now being operated privately.

Trainmen in the employ of the Aurora, Elgin & Chicago Railroad, Wheaton, Ill., have received an increase in pay averaging about 20 per cent.

Employees of the United Railways, St. Louis, Mo., have requested a reopening of the wage agreement.

Further changes in New York's Public Service Commissions are recommended in the report of the reconstruction commission in that State. It is expected that the matter of increased fares will again come before the Legislature.

Employees of the Interborough Rapid Transit Company, New York, N. Y., have asked for an increase in pay of 25 per cent. Further conferences will be held. Last July wages were increased 25 per cent.

A bill has been introduced in the Legislature of Ohio providing for municipal ownership of railways in cities. The measure is in the interest of the settlement of the controversy at Toledo.

The superintendent of Seattle's municipal railway has recommended an issue of bonds to provide funds for the

extension and betterment of the property.

Council of Detroit, Mich., has before it for action the proposal of Mayor Couzens to authorize an issue of bonds to the amount of \$15,000,000 for railway construction by the city.

S. M. Gallaher, manager of railways of the Monongahela Valley Traction Company, Fairmont, W. Va., has resigned to become head of the engineering and construction departments of the Cleveland (Ohio) Electric Illuminating Company.

Harry Clark, treasurer and assistant general manager of the Empire State Railroad, Syracuse, N. Y., has resigned.

The Public Service Commission of Missouri has authorized the city Light & Traction Company, Sedalia, to charge 6-cent fares on its lines.

The cars of the local and interurban lines of the Detroit (Mich.) United Railway were involved in more than 10,000 collisions with motor vehicles during the first ten months of 1919.

The Richland Public Service Company, Mansfield, Ohio, plans to charge 8-cent fares beginning Jan. 1, 1920.

The Eastern Massachusetts Street Railway plans to establish a freight system throughout its system in Essex County, Mass.

The Illinois Public Utilities Commission on Dec. 23 issued an order reducing the fares on the Chicago Surface Lines to a straight 6-cent basis. The order became effective at midnight on Dec. 26.

Rolla Wells, receiver for the United Railways, St. Louis, Mo., has announced that he will shortly apply to the State Public Service Commission for authority to make a charge for transfers on the company's lines.

The statement is printed in full this week which was issued by the Public Service Corporation of New Jersey indicating that the experiments of the Public Service Railway with the zone fare cost that company \$1,500,000.

Both sections of the commission appointed to deal with the railway situation at Toledo, Ohio, are conducting hearings. Material progress is reported, with the prospect that the respective reports will be ready well within the time allowed to put the matter before the voters for decisive action.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Urges Bond Issue

Detroit Council Soon to Take Up Measure Appropriating \$15,000,000 for Railway Construction

The ordinance and resolution introduced in the City Council of Detroit, Mich., for Mayor Couzens more than a month ago, proposing that a bond issue of \$15,000,000 for the construction of needed extensions, be submitted to the voters, but making no provision for operation of the lines, will be taken up by the Council committee of the whole for action in the near future.

MAYOR OPPOSED TO TAYLER PLAN

Among other objections voiced by Mayor Couzens in opposition to the Tayler service-at-cost plan as submitted by the Detroit Street Railway Commission before its members resigned as a body, was the claim that the present city charter gave city officials no power to enter into an agreement with private parties for the operation of railway lines. It is believed that an amendment to the city charter, to permit the city to enter into an agreement with the Detroit United Railway, providing for joint use of the existing lines and proposed municipally constructed extensions, may be one of the points of the railway ordinance as submitted to the Council for final action.

Three methods for working out an operating policy have been suggested. One provides for favorable action by the Legislature of Michigan authorizing the city of Detroit to operate cars over the Detroit United Railway's lines on which franchises have expired and on such non-franchised lines as are now being operated by the Detroit United Railway under the so-called day-to-day agreement.

The plan which the Mayor is believed to be seriously considering is that of forming a complete independent system by linking up the new extensions, the new system to be operated in competition with the Detroit United Railway.

EMPLOYEES FAVOR TAYLER PLAN

The third plan is to submit a charter amendment revising the section of the city charter relating to electric railways, empowering the city to negotiate an agreement providing for the interchange of traffic between the Detroit United Railway and the city-owned lines.

Representatives of the railway union who were influential in the settlement of the recent strike in Detroit and at one time advocates of municipal ownership, favor the adoption of the proposed Tayler plan. It is claimed that the rail-

way employees have achieved better working conditions and more satisfactory relations when dealing with practical traction executives than with officials appointed by the municipalities.

Seattle Planning Improvements

The utilities committee of the city of Seattle, Wash., has asked Thomas F. Murphine, superintendent of the city's municipal railway system, to submit a statement covering proposed extensions, terminal facilities, construction work and other betterments and improvements planned by the railway department in 1920. The statement will pave the way for consideration by the City Council at an early date of the proposal to construct a terminal station in connection with the city's transportation system.

The bond issue of \$790,000 for needed extensions authorized by the city shortly after the electric railways were taken over has been exhausted by the department in construction of important extensions. Additional construction work will probably be necessary in 1920. In order that all the projects contemplated may be grouped together and financed as the construction program of the department for the entire year with an issue of utility bonds, Councilman Drake, chairman of the finance committee, is desirous of obtaining a complete statement.

The question of a terminal station is under consideration by city officials, Mr. Murphine having submitted tentative plans for a subway, elevated and terminal system. Chairman Drake has expressed the opinion that a common terminal station is absolutely necessary. He believes that it would be wise to start action toward securing a site and undertaking construction.

Mr. Murphine states that the railway system is losing \$1,000 a day by duplication of service on the downtown streets that could be eliminated with a terminal station.

Municipal Ownership Bill Introduced

The right of municipalities to issue bonds for the purchase, construction and operation of city railway systems is provided in the bill introduced in the House at Columbus, Ohio, by Representative Brach of Lucas County. The bill is in the cities committee.

The bill permits a municipal corporation to bond itself to a total indebtedness of not to exceed 2 per cent of the total valuation of all property in the municipal corporation. The revenue from the lines is to be used to retire the bonds and pay the interest.

Toledo Commission Busy

Both Branches of Body Charged With Drawing Settlement Plans Rushing Work

The commission is at work that was appointed to consider the settlement of the electric railway controversy in Toledo. Two proposals will be submitted, one by part of the commission on the question of municipal ownership and the other by members of the commission on a service-at-cost arrangement.

It will be recalled that the resumption of service by the Toledo Railways & Light Company, after a suspension of almost a month, followed the amendment of the ouster ordinance of the City Council upon the appeal of the Mayor, who originated the ouster measure, and the issuance of a mandatory order by Judge Killits in the federal court.

The settlement commission is working in accordance with the orders of the court. Both sections of the commission are perfecting their plans. Already the municipal ownership section has initiated a bill which would give the city the right to issue general credit bonds to acquire the transportation system. The municipal ownership section further has appealed to the citizens who are in favor of taking over the lines to support the bill by urging their representatives in the Legislature to enact the measure.

Under the service-at-cost plan as proposed the city and not the company will own the railway at the expiration of the franchise period. This amortization feature is considered advantageous alike to the company and the city.

H. L. Doherty, as operating head of the company, has been asked for terms under which he would sell so that the municipal ownership section may proceed more intelligently. It was said unofficially that Mr. Doherty would be willing to accept 20 per cent of the purchase price in cash and the remainder in 7 per cent debenture bonds.

Interest in the work of the commission outside of Toledo is not so much in the matter of how the two sections carry on their work and the details of their deliberations as it is in result of the deliberations. The final reports of the commission are therefore awaited expectantly, for on them will be based the ordinances to go before the voters, who it is hoped will then decide beyond a question of a doubt whether Toledo shall take over the lines or whether the present company will be permitted to continue operation under terms affording proper service to the public and sufficiently broad adequately to protect the company.

Transit Legislation Likely in New York

Fare and Commission Regulation Measures to Be Presented at Coming Legislative Session

The Legislature of New York is not yet in session, but there is apparent an unwillingness to accept as final a recent statement by Senator Thompson that the Legislature is without power to permit an increase in electric railway fares. One of those who openly takes issue with Mr. Thompson is Godfrey Goldmark, former counsel of the Public Service Commission for the First District of New York.

A LAWYER SEES IT DIFFERENTLY

Mr. Goldmark said that he had no special interest in the controversy, except as a citizen and as a lawyer, and while he thought the courts would support his contention, so far as it related to fares on the rapid transit lines, his opinion was based on other authorities than the one quoted by Mr. Thompson, who cited a recent decision by the United States Supreme Court in litigation at Columbus, Ohio. Mr. Goldmark said that in the ordinary case where a city grants a franchise to an electric railway and fixes the rate of fare, the courts of other states have held that the rate may be increased by the Legislature over the city's objection, because the city, in fixing the rate, acted as an agent of the State, and, therefore, the State as the principal, might modify the contract.

So much for the legal side of the matter. As to the legislative side, an unnamed critic of Mr. Thompson points out that it is well to bear in mind that important legislation is seldom successfully introduced and passed in the newspapers and that the Legislature is itself the final judge of what it will do. It is reasonable to suppose, so this source of information says, that if the Legislature is satisfied some sort of relief is necessary for the protection of property interests, the Legislators will not allow one or two members to block it. Some drastic measure may be proposed designed to obstruct the present avenues through which relief may eventually be secured, but the likelihood is remote of such measure being passed.

RECONSTRUCTION COMMISSION REPORTS

As a matter of fact it is expected that the various measures to be proposed by the reconstruction commission will occupy the chief spot in the limelight. Even these measures will probably only advance far enough to make material for the coming political campaign. A loud noise is expected from the adherents of some of the more radical members, but with the presidential primaries in April and the necessity for an early adjournment it is doubtful if any legislation from this source will get very far.

As stated before, the various measures to be proposed by the reconstruction commission will be the absorbing topic. The complete report of that commission has just been published.

So far as the electric railways are concerned the only part of the report of interest to them is that which contains the suggestions of the commission regarding the proposed reorganization of the Public Service Commissions.

The recommendations made therein are considerably at variance with the recommendations of the so-called Thompson committee, headed by Senator Thompson, that inquired into the work of the commissions. A particularly distasteful aspect of this report to some will be that it makes no particular provision for the political advancement of any particular person.

The reconstruction commission sees clearly that with two commissions such as there are in New York the benefit is lost of having a single authority deal with similar or identical problems such as street railway rates, but it still is of the opinion that for the present the two district commissions should be maintained. At present there are two Public Service Commissioners in New York City, both appointed by the Governor, one in charge of regulation and one in charge of transit construction. The reconstruction commission points out that the transit construction commissioner exercises in no sense a state function and that that office should be transferred to the city and the commissioner appointed by the Mayor.

TWO COMMISSIONS SUGGESTED

The reconstruction commission, therefore, has recommended that the powers and duties of regulation of public utilities be vested as at present in two public service commissions to be known as the first and the second district commissions each under a single commissioner appointed by the Governor with the approval of the Senate and serving at his pleasure. These commissioners will have two deputies each. This will involve a complete reorganization of the second district commission. The commissioners and their deputies will have power to act in a quasi-legislative or quasi-judicial capacity either singly or as a commission, but the commissioner is to be responsible for all decisions. The present First District Commission will be grouped under four bureaus. This will involve a logical consolidation of several existing bureaus. The legal work would be transferred to the office of the Attorney General. Only statutory changes will be necessary, in order to bring about these modifications.

Receiver Wants Buses Regulated

Declaring that jitney and motor bus competition is ruinous to the traction systems of the country, Zenas W. Bliss, a receiver of the Rhode Island Company and chairman of the Rhode Island Board of Tax Commissioners, said that such competition must be suppressed

and the electric railways given a virtual monopoly if they are to exist, in an address before the eighth annual conference of the members of the New England Tax Officials Association during the week ended Dec. 13 at the State House in Boston, Mass.

Based upon his experiences as a receiver of the Rhode Island property, Mr. Bliss said that jitney competition means the destruction of vast legitimate values, the disruption of transportation, inconvenience and great unnecessary expense and financial loss.

Increased cost of operation, competition, public regulation, public opinion, taxation and inadequate gross revenue, are the principal difficulties, Receiver Bliss said, that are affecting the traction companies throughout the country. His subject was "Cost Problems of Traction Systems and Their Solution."

Mr. Bliss told the conference that he was decidedly in favor of regulation of traction properties by constituted authority with guarantees, as against public ownership. He laid stress upon the antagonistic attitude of the public toward the traction concerns and said that the people refuse to ride at the increased cost, although they pay more for everything else.

Receiver Bliss indicated a strong tendency to favor subsidizing the Rhode Island Company by the State without removing the real estate taxes against the utility, but eliminating all street paving and franchise obligations.

Interborough Men Want 25 Per Cent More

Fifty-four members of the general committee of the Brotherhood of Interborough Rapid Transit Employees called on Frank Hedley, president of the Interborough Rapid Transit Company, New York, N. Y., on Dec. 22 to discuss the making of a new wage agreement in place of the existing two-year agreement which expires on Dec. 31. They asked that the pay of the men be increased so that wages received would equal the amount the men would be receiving if their demands of last August for a 50 per cent increase had been granted.

Failure to yield instant compliance with the demands of the men last Summer for the 50 per cent advance in wages resulted in a complete tie-up of the lines from 4 o'clock on the morning of Aug. 17 until midnight on Aug. 18, when the men returned to work on a compromise arrangement of a 25 per cent increase and the understanding that the demand for enough more to make up the other 25 per cent might be renewed later on.

In discussing the matter Mr. Hedley said:

Any changes to be made must be inserted in the new agreement. I am glad to say that the meeting has disclosed that there is the most cordial co-operation between the company and the men, a real spirit of co-operation. We have the requests of the men and they will receive consideration. There will be another meeting about the middle of January, when, I hope, a satisfactory agreement will be reached.

Lawrence Service Under Local Control

The jitneys in Lawrence, Mass., prevented by the city from operating after the Eastern Massachusetts Street Railway had withdrawn service as noted in the *ELECTRIC RAILWAY JOURNAL* for Nov. 15, page 948, did not give up the fight without a struggle. The jitney owners, numbering about 250, determined to take the issue to the public and though a fine of \$10 was provided for the penalty for operation within the city limits, jitney service was continued for a time.

Restoration of electric railway service was accomplished through an agreement reached whereby the trustees of the Eastern Massachusetts Street Railway turned over control of the service to a committee of citizens of which James H. McBride is chairman and on which manufacturing interests, retail store owners, the Central Labor Union and newspapers are represented. Furthermore, the chief of police served notice that jitney operators within the city limits would be arrested on sight.

The sympathy and co-operation of the public, together with a genuine desire on the part of the railway officials to render satisfactory accommodation at the lowest possible rate give encouragement for the future of railway service.

The statement of the Eastern Massachusetts Street Railway says in part:

The public trustees of the Eastern Massachusetts Street Railway are gratified that the people of Lawrence will enjoy the low fare which was impossible while the unfair jitney competition existed. The trustees have turned over complete control of service to the citizens' committee. A much more frequent schedule than has hitherto prevailed will become effective.

With the continued co-operation of the City Council and the citizens' committee, the trustees are confident they will give Lawrence an electric railway service which will be generally satisfactory in point of service and fares.

It is proposed to institute strip tickets, giving sixteen fares for \$1.

Aurora-Elgin Wages Increased

The wage increase awarded employees of the Aurora, Elgin & Chicago Railroad, Wheaton, Ill., by Judge Evans of the United States District Court will be accepted. The men are not satisfied with the offer, but say that they will work under the new scale until the expiration of their present contract next June.

All increases awarded by Judge Evans are retroactive to Aug. 21. The contract of May 31, 1918, provided for a wage scale of 46 cents an hour for city motormen and conductors. In the general increase of 20 per cent allowed by the court the trainmen will secure an advance of 9.2 cents, to 55.2 cents an hour. The city motormen and conductors will receive an increase of 7.3 cents to 43.8 cents an hour. The raise, exclusive of the service bonus, amounts to 2.3 to 4.2 cents an hour more than the men now receive, they having been granted an increase of 5 cents an hour on Aug. 21, with the understanding that they were to receive a further increase

if an investigation of their demands by Judge Evans warranted it.

The increase in wages granted on the length of service schedule of 1 cent an hour for each five years will almost equal the general 20 per cent increase on an average for all employees. There are only thirteen motormen and twenty-three conductors who will not receive at least a 1-cent increase under the length of employment clause. They have entered the service of the company since 1914. Almost one-third of the employees have been with the company long enough to draw a 3-cent increase and fifty more are entitled to a 4-cent an hour increase. There are, several men who will receive the 5-cent increase for twenty-five years of employment.

St. Louis Labor Restive

Employees of the United Railways, St. Louis, Mo., who are members of labor unions have begun a new movement for a general increase in wages. The request of the unions is for a re-opening of their wage contracts.

The unions are the electrical workers, the metal workers, and the blacksmiths. While a new wage schedule has not been prepared it is said the request will be for increases of varying amounts.

In addition to a higher wage movement by these four unions, which are outside of the union of trainmen, members of the latter organization who comprise the great bulk of the United Railway employees, also are said to have virtually agreed to ask for a re-opening of their wage contract between now and April 1 next, and to ask for higher pay.

The United Railways has not yet completed the payment of back wages under the last wage award and some dissatisfaction has been shown by the men because of the delay.

When the last wage award was made to employees, officials of the United Railways told the State Public Service Commission the company could not pay the advance without getting higher fares. The company, according to its officials, is not benefiting to any great extent from the 8-cent cash fare. Cash fares are now only 4½ per cent of the total, thus indicating that any further wage increases would have to be met by increasing the fare to 8 cents whether paid in cash or by token.

New Texas Interurban Line Likely

The preliminaries to plans for financing a new electric railway from Dallas to Wichita Falls, Tex., have progressed sufficiently to warrant the statement that it is fairly probable that ground will be broken by spring. The distance between the two cities is 130 miles and there is at present no direct rail connection between them.

The great activities in the oil industry and the very high price of cotton together with the great increase in

other agricultural pursuits in Texas, have created business conditions in the north of Texas so good that even present enormous construction costs may not defer work on the proposed line. If the line is built, it will be made a high grade property in every respect, and assuming a present-day average cost of \$60,000 a mile for such a road, it will cost in the neighborhood of \$8,000,000. It is expected that the near future will bring forth definite information in regard to this project.

Chicago Transportation Board Appointed

Four members of the board who will prepare a transportation plan for Chicago were appointed by Mayor Thompson recently. They are Samuel A. Etzelson, Corporation Counsel; Charles R. Francis, Commissioner of Public Works; John P. Garner, an Alderman; and P. H. Moynihan, ex-Alderman. These four are to agree upon an engineer as fifth member of the commission. They will have \$250,000 to spend in the nine months before their report is due. Meanwhile weekly meetings will be held.

Mayor Thompson's plan has been referred to several times in these columns. It contemplates the taking over the existing surface lines for public operation by an elected board of trustees, and the assurance has been given that a 5-cent fare will be sufficient to meet all expenses.

Seattle Would Take Over More Lines

The Puget Sound Traction, Light & Power Company, Seattle, Wash., has renewed its offer to sell to the city of Seattle its North Ballard or Greenwood railway operated by the Western Washington Power Company. A previous offer from the traction company naming \$81,000 as the purchase price was rejected by the City Council. The new tender provides that the property will be transferred to the city "for an amount to be decided upon as the result of an appraisal made by representatives of the city and the company, or by the City Council and representatives of the company." All the property of the company, south of Eighty-fifth Street, including approximately 4½ miles of track on Fifteenth Avenue, N.W., is embraced in the company's offer, with the exception of two safety cars now operated over the line.

The company agrees to accept in payment of the property transferred utility bonds of the same description as those issued by the city to negotiate the \$15,000,000 purchase of its railway properties by the city last spring.

The city has started negotiations with the Seattle & Rainier Valley Railway for the purchase of its lines. It has asked the company to state in writing within sixty days its position in the matter, if a resolution passed by the utilities committee is adopted by the Council.

News Notes

National Safety News Letter.—The Weekly News Letter of the National Safety Council is now being published under the title "National Safety News." Louis Resnick is editor.

Morris County Employees Organize.—Ninety employees of the Morris County Traction Company, Morristown, N. J., are said to have formed a local branch of the Amalgamated Association on that property.

Objects to Withdrawal of Claims.—The Federation of Civic Bodies of the Northside, Pittsburgh, Pa., has filed with the City Council of Pittsburgh an objection to the request of the receivers of the Pittsburgh Railways that all municipal claims against the company be withdrawn. The civic bodies insisted that such a course would be "unbusiness-like."

Writes on Electric Railways.—The *Saturday Evening Post* for Nov. 15 contained an article by Edward Hungerford entitled "The Plight of the Traction" in which the author discussed the electric railway situation in the country at large. The article reviewed the history of electric railway development in the United States and urged the general establishment of the zone-fare system.

Parallel Suits Will Be Pushed.—Mason B. Starring, president of the United Railways Investment Company, controlling the United Railroads, San Francisco, Cal., is quoted to the effect that suits against the city of San Francisco over the paralleling of the company's tracks on Market Street would be pushed, as the legal department of the company had advised him that the company had a good case.

Suggests Municipal Operation for Bridge Cars.—The Board of Estimate of New York has submitted to the committee on franchises a suggestion from Commissioner of Plant and Structures Grover A. Whalen to have the city operate the local railroad line now operated by the Bridge Operating Company over the Williamsburg Bridge. The permit issued to the company expires May 31, 1920. Mr. Whalen would have the city take over the lines as of that date.

Railway Robbed.—Six robbers, one of whom remained in an automobile outside, held up the office of the United Railways at 3820 Easton Avenue, St. Louis, on the night of Dec. 11 and stole \$2,600 with which they escaped. The men drove up to the office entrance shortly before 10:30 p. m., after most of the conductors had made their returns for the day and while cashiers were counting the money in the office. After the robbery the men backed out

of the office, after warning the employees not to follow them.

Gas Decision Attracts Attention.—The Appellate Division of the Supreme Court on Dec. 19, handed down a decision declaring the courts had the power to decide whether the statutory rate for gas was unconstitutional because it was confiscatory, and, having so decided, the rate to be charged could be fixed by the Public Service Commission. The decision was in the suit of the Bronx Gas & Electric Company, which applied to the courts to permit it to charge more than the statutory charge of \$1 per 1000 cu ft.

Buses for Philadelphia.—Russell Thayer, president of the Platinum Metal Company, has applied to the Pennsylvania Public Service Commission for a certificate of convenience to permit of the operation of 100 motor buses on Broad Street, Philadelphia. In lieu of taxes and franchise fees the city is to receive one-half of the profits for a period of twenty years, at the end of which the property is to revert to the city. The city is to have at least three representatives on the board of directors.

Wreck Jury Disagrees.—The jury failed to return a verdict on Dec. 18 in the trial of John J. Dempsey, former vice-president of the New York Consolidated Railroad (Brooklyn Transit System) charged with manslaughter as a result of the Malbone Street tunnel disaster of a year ago. More than ninety persons were killed and several hundred injured in the accident on the line, which the prosecution attempted to prove resulted from neglect on Mr. Dempsey's part in permitting an inexperienced motorman to handle the train.

The Chamber of Commerce, U. S. A.—In response to a resolution supported by a brief presented by Engineering Council, the Board of Directors of the Chamber of Commerce, U. S. A., has authorized the appointment of a special committee of the Chamber to investigate and report on our project for a department of public works. It is our hope that the logic and merit of the plan will so commend itself to the committee that the Chamber will be persuaded to present the matter for referendum to the member bodies throughout the United States.

Sarnia Talking Municipal Ownership.—As a result of a special meeting of the City Council of Sarnia, Ont., on Dec. 13 the Provincial Hydro officials will be requested to visit Sarnia and make a report on the present electric railway system. Sarnia is think of taking over the lines. J. J. Jeffrey of the Provincial Commission outlined the method of procedure adopted in the border cities for the acquisition of the Sandwich, Windsor & Amherstburg Railway, and suggested that the resolution inviting the hydro commission be adopted by the Council.

\$1,200,000 B. R. T. Wreck Claims.—Federal Judge Mayer has approved the preliminary report of Philip J. McCook,

special master, in deciding the last claims against the Brooklyn (N. Y.) Rapid Transit Company. The claims so far allowed for injuries and deaths resulting from the Malbone Street disaster, in which more than ninety persons were killed, amount to \$300,000. It has been estimated that the total damages which the sufferers from the accident will collect, will approximate \$1,200,000. The company has no funds available for the payment of the claims.

Will Arbitrate One-Man Car Wage.—Following a conference between the public trustees of the Eastern Massachusetts Street Railway, Boston, Mass., and the joint conference committee of the unions at which no satisfactory agreement could be reached for wages for men operating one-man cars, the two parties decided to submit the matter to arbitration. The company offered the joint conference an increase of 5 cents an hour to 56½ cents an hour, but the committee refused to accept it. The present wage is 51½ cents an hour for three-year men. The company is planning to put one-man cars in operation within a short time and began negotiations for satisfactory remuneration so a decision would be forthcoming when the new type of cars is started.

Wage Award Announced.—The report of the arbitrators who inquired into the matter of wages and terms of service for the trainmen of the Grand Rapids (Mich.) Railway had not been formally presented on Dec. 13, but on that date announcement was made as to their findings with respect to wages. The arbitration board consisted of three members. The neutral arbitrator and the representative of the company recommended that men in the service more than a year receive 51 cents an hour and those in the service more than three months and less than a year 48 cents and new men 45 cents. A. A. Ellis, representative of the employees' union, believes that the lowest possible figures should give one-year men 56 cents an hour, those having served three months and less than a year 51 cents, and beginners 45 cents.

Program of Meeting

A Public Works Convention in Washington

A call has been issued for a convention to be held in Washington on Jan. 13 and 14, for the purpose of broadening the scope of the campaign of the National Public Works Department Association for a National Department of Public Works and to discuss and adopt plans and policies for the subsequent legislative campaign, and finally to focus the situation by intensive work in Congress. The invitation includes: (a) the organizations that were represented at the Chicago Conference last April; (b) the State campaign committees from the entire country; (c) the technical organizations not represented; and (d) the industrial interests of the country.

Financial and Corporate

Prospects Greatly Improved

President P. J. Kealy of Kansas City Railways Believes Company Will Return to a Paying Basis

A protective committee has been formed in the interest of the security holders of the Kansas City (Mo.) Railways. The company is in default in the payment of interest on some of its obligations. The committee has asked a prompt deposit of the securities in question with one of the depositaries named for the purpose of mutual protection. Interest due on Nov. 15 on certain of the company's obligations remains unpaid, and further defaults are said to be impending.

MR. KEALY'S STATEMENT

The committee has addressed to the holders of all the company's funded obligations, both bonds and notes, a letter from Philip J. Kealy, president of the railway, dated Nov. 5. In his letter Mr. Kealy points out that the funded debt of the company aggregates \$29,606,700. He says that the valuation of the property of the company as recognized by the Public Service Commissions of Missouri and Kansas is approximately \$35,500,000. There is also about \$1,000,000 additional value that probably would be allowed when presented. In addition to its funded debt, the company also owes about \$2,500,000 on demand notes and accrued accounts and vouchers for labor, labor supplies, etc.

Mr. Kealy says that the equity is represented by nominal stock of \$100,000 held by trustees against which are issued preferred and common participating certificates, the owners of which are for practical purposes stockholders. Until the extraordinary conditions which he describes at length began seriously to impair the earnings, the company made money. For the fiscal years ended June 30, 1915, 1916, and 1917, it made \$301,000, \$590,000 and \$519,000, respectively, above fixed charges including taxes. For a number of years prior the company had earned on a comparable basis.

DETAILS OF INCREASED COSTS

While in June, 1918, the first increase of fare was obtained and a favorable forecast seemed justified, labor troubles, the influenza epidemic, and other unavoidable conditions prevented this being realized. In 1919 the company failed by \$505,000 to make operating expenses without taking into consideration its fixed charges. As an instance of its burden, Mr. Kealy cites that in comparing 1919 with 1915, and using approximate figures, labor increased in cost 90 per cent, fuel 100 per cent, and supplies 100 per cent.

The deficit piled up by the company

was made good out of equity and by some of the stockholders personally guaranteeing in part the loan. Mr. Kealy says that the July interest and the large number of deferred vouchers, the existence of which threatened receivership, were paid by the holder of a part of the equity personally guaranteeing the demand notes of the company for \$1,000,000. The borrowing power upon the equity is exhausted.

After careful investigation there was no reason to believe that the company could from any source pay the interest due on Nov. 15 or Jan. 1 next, or the principal of or interest on \$1,000,000 which fell due on Dec. 1.

In the year ended June 30, 1919, certain conditions existed which are not likely to recur. These materially impaired the company's earnings. Mr. Kealy feels that if the company is permitted to continue operation uninterrupted and unimpaired by receivership for a minimum of one and a maximum of two years, it can return to a paying basis. Among the factors that lead to this conclusion are the following:

(a) The Public Service Commission of Missouri holding it could increase the franchise fare with the Supreme Court affirming its action granted a 6-cent fare and later increased this to an 8-cent and 7-cent basis. Similar action resulted in a 6-cent fare in Kansas with good prospects of obtaining there the rate now in effect in Missouri.

(b) Public co-operation steadily improving. The Chamber of Commerce has recently appointed 100 business men to aid in bettering the situation.

(c) Effective business regulations have just been made and this, with natural causes, will greatly lessen if not remove such competition as has affected the company adversely in the past.

(d) The labor situation from being very bad has become very good.

(e) Negotiations pending with fair prospect of success for obtaining a release from present franchise burdens, having no relation to service.

(f) Increased revenue being realized, the gross being the largest in the history of the company.

(g) The public seemed to begin to realize that it could not let the operation of the property become seriously impaired without itself losing thereby.

"What It Is Costing to Operate Your Street Railway"

Under the caption quoted above the Kansas City (Mo.) Railways recently published in the *Kansas City Railwayman* a tabulated statement of the cost of operation for May "for the consideration of every street car patron." The figures show what the company actually spent in May, 1919, and the cost per passenger as compared with May, 1918. Comment on the cost of service is published in a column at the side of the tabulated statement. This comment is concluded with the statement that "the startling fact remains that exclusive of all interest, all debt, all fixed charges, the actual day to day wages and fuel, is 6.6 cents per fare passenger carried."

Valuation and Depreciation

Commission's Engineers State Valuation for Los Angeles and Make Recommendations on Depreciation

In the recent report of the engineering department of the California Railroad Commission in the fare case of the Los Angeles Railway Corporation, mentioned on page 959 of the issue of this paper for Nov. 15-Dec. 13, the reproduction cost new, as of Dec. 31, 1919, was found to be \$26,046,764, and the reproduction cost less depreciation \$22,900,000, making the condition of the property 89 per cent.

The valuation of the railway property was based on the appraisal of Dec. 31, 1913, the two valuation figures for the operative property found at that time being: (a) Reproduction cost, \$22,322,430; (b) reproduction cost less depreciation, \$19,217,269. These figures were brought to date by the addition of the company's new capital expenditures and betterments and deduction for retirements. In the estimate of reproduction cost new less depreciation, these additions (amounting to \$3,724,677) have not been depreciated, because their average age was not more than two years.

PROPOSED FRANCHISE

The proposed new "indeterminate re-settlement franchise," to quote from the opinion of the commission's engineers, should contain definite provisions concerning the following matters:

(a) The conditions under which the city can acquire the property should be definitely set forth and the methods of determining the value of the property should be specified.

(b) The disposition of all revenues should be dealt with in the franchise and recognition should be had of the essential necessity of making revenue available in the following order: 1, operating expenses; 2, depreciation; 3, taxes; 4, fair return.

(c) Burdens not necessary or essential to street railway service should not be placed on the patrons of the street railway and in this connection particular attention should be paid to the elimination of unnecessary and unjustifiable paving requirements.

(d) The franchise should recognize the absolute necessity of an adequate depreciation reserve and should safeguard this reserve in every possible way so that it can be used only for the purposes for which it is intended.

(e) The franchise should contain provision for the best possible service and for additional service as required.

(f) The conditions under which extensions should be built and the methods of financing such extensions should be dealt with in the franchise.

(g) The disposition of surplus earnings over and above the requirements as set forth under (b) should be dealt with in the franchise.

(h) Check and regulation of all expenditures, including contracts, by the city authorities, jointly with, or separately from, the functions of this commission, should be provided for in the franchise.

(i) Provision should be made for the revocation by the city of the franchise upon proper notice and upon obligation to purchase by the city.

ECONOMIES POSSIBLE

The franchise question, in the opinion of the commission, should be settled before any number of franchises expire and in order to put the company in a position where it can make proper provision and allowance for the financing of such reconstruction as will become necessary.

The details of a rerouting plan were worked out by the engineers of the commission, by which it was expected there would be a saving of \$4,000,000 per annum, equal to 13 per cent of the company's entire car mileage, with a saving of 17½ per cent in car hours. There was a strong plea for the purchase of safety cars and for a reduction of paving charges, as mentioned in the article last week.

CARE OF DEPRECIATION

Commenting on the proposed clauses (b) and (d) in the proposed franchise, the report declares that payments to a depreciation reserve are a portion of operating expenses and should therefore come ahead of fixed charges. On this point the commission's chief engineer says, in part:

Payments into a depreciation reserve are a portion of operating expenses, and the proper sums to be set aside should, therefore, come ahead of fixed charges and other requirements. This company is following the practice of varying its depreciation allowance according to gross earnings and available net earnings regardless of the actual requirements for a depreciation reserve. Since 1911, the depreciation accruals have varied from a minimum of 4 per cent to a maximum of 8.4 per cent of gross income. A policy is not a good one under which a reserve for depreciation is treated as a secondary and theoretical proposition only and under which the payments into the fund vary with the earnings. In addition, this company, in common with other utilities in this State, handles its depreciation reserve as a bookkeeping matter only. There is no actual and separate depreciation fund and there are no definite rules and regulations governing the use of such a fund.

The purpose of the reserve must be to make provision for the replacement of the depreciable property at the end of the reasonable expected life. It is not possible to estimate beforehand exactly what the annual allowance should be, but it is possible closely to approximate the actual requirements. The fund should be neither too large nor too small, and to accomplish this object it will be necessary from time to time to compare the actual depreciation of the property with the allowances and their accumulations and to either increase or decrease the periodical allowance as the actual conditions may demand.

Under no circumstances should depreciation funds be used for purposes other than those for which they were set aside, and the accounting, investing and disbursing of the funds should be under the detailed and strict control of the commission. The fund should be invested with a view to safety only, and security of principal should never be sacrificed to earning power. The reserve should be held in the form of a sinking fund, analogous to a trust fund, and all earnings of the reserve should be added to the fund. It is not desirable, in my opinion, to demand a certain definite interest return from the depreciation reserve and I believe it is better merely to require that all earnings, whether large or small, and as they may fluctuate from year to year, should become part of the fund.

Later, the sum of \$720,000 a year was suggested as a depreciation allowance.

Hopeful of Reorganization

Mason B. Starring, president of the United Railways Investment Company, controlling the United Railroads, San Francisco, Cal., has been in that city lately. The Chronicle quotes him as expressing the hope that the reorganization committee of the United Railroads will have completed its plans early in 1920, and that shortly thereafter the affairs of the company will be on a more satisfactory basis. The committee, he said, had been making good progress.

I. R. T. Goes \$8,473,098 Behind 1918 With All Its Available Cash Surplus Used Up, Company Operating New York Rapid Transit Lines Faces Receivership

The résumé of the report of the Interborough Rapid Transit Company, New York, N. Y., for the year ended June 30, 1919, prepared by the company itself was made available to the press in two installments. The first installment of the statement dealt with developments during the twelve months of new lines and other addi-

for while the gross operating revenue (\$43,207,209) increased \$2,709,481, the operating expenses (\$26,233,326) increased \$7,119,990.

The subway division showed an increase in operating revenue of 12.78 per cent and the elevated division a decrease of 0.44 per cent. The operating expenses increased 37.25 per cent.

The profit and loss surplus (stated exclusive of accruals due the company under Contract 3 and Related Certificates, payable from future earnings, and aggregating as of June 30, 1919, \$10,457,478) stands at \$10,152,092, a decrease of \$5,553,476. This, however, the report points out, represents no cash or other quick assets available for current use, the quick assets being more than offset by amounts due for supplies, taxes, etc.

During the year the company's available quick assets have been exhausted in meeting the increased costs of operation and maintenance. These costs will be still further increased in the current fiscal year by the recent 25 per cent increase in wages amounting to approximately \$5,000,000 a year.

During the year Stone & Webster, engineers, made an exhaustive investigation and analysis of the Interborough properties for bondholders' protective committees. The preliminary report, just issued, sets out the following table of their estimates of probable deficits for the fiscal years 1920 to 1924 inclusive as a result of continued operation on a 5-cent fare and the present prices of materials and supplies together with the present wage scale which was recently increased 25 per cent in rates.

The Stone & Webster report adds:

We estimate, therefore, that the company will require before July 1, 1924, under the new wage scale now in force, in addition to about \$7,400,000 needed to cover additional expenditures for capital purposes, \$35,390,000 for deficits, making a total cash requirement for that period, in addition to earnings, of \$42,790,000. This amount may be reduced, possibly to the extent of \$3,000,000 by savings from the construction fund.

It is clear that, if the present fares, wages, cost of materials and supplies and other operating expenditures continue in force the company will not be able to earn its fixed charges for many years after 1924.

COMPARATIVE STATEMENT OF INCOME OF INTERBOROUGH RAPID TRANSIT COMPANY

Year ended June 30	1919	1918
Gross operating revenue	\$43,207,209	\$40,497,728
Operating expenses.....	26,233,326	19,113,336
Net operating revenue	\$16,973,883	\$21,384,391
Taxes.....	3,134,156	3,758,583
Income from operation	\$13,839,726	\$17,625,808
Non-operating income....	607,302	593,599
Gross income.....	\$14,447,028	\$18,219,408
Income deductions.....	18,257,368	13,556,649
Net corporate income for the year.....	\$*3,810,339	\$ 4,662,758
Add:		
†Surplus, June 30, 1918 and June 30, 1917.....	\$15,705,569	\$17,199,878
Other credits.....	25,110	137,296
Totals.....	\$11,920,339	\$21,999,933
Appropriated for:		
Amortization, capital retirements and other charges.....	\$ 18,247	\$ 169,364
Dividends.....	1,750,000	6,125,000
Total appropriations...	\$ 1,768,247	\$ 6,294,364
†Profit and loss—Surplus.	\$10,152,092	\$15,705,569

†Stated exclusive accruals under Contract 3 and Related Certificates payable from future earnings and aggregating as of June 30, 1918, \$2,957,407 and as of June 30, 1919, \$10,457,478. *Deficit.

tions and improvements to the service rendered to the public. The second installment dealt with the company's condition and its financial operations for the year. The second installment is undoubtedly of greater interest than the first to operating officials and others readers of the ELECTRIC RAILWAY JOURNAL so reference will be made to that first.

It is pointed out that owing to increased costs of materials and supplies, increased wages and other expenses of operation the company has now used up all its available cash surplus, and unless the rate of fare is permitted to be increased, the company cannot much longer avoid a receivership.

Item	1920	1921	1922	1923	1924
Estimated deficit on prior wage scale as shown by Stone & Webster report of Aug. 11.....	\$2,978,000	\$3,628,000	\$1,905,000	\$543,000	\$864,000 (Surplus)
Estimated additional expenses resulting from 25 percent increase in wages.....	4,800,000	5,050,000	5,250,000	5,450,000	5,650,000
Total estimated deficit by years on new wage scale.....	8,778,000	8,678,000	7,155,000	5,993,000	4,785,000

The net corporate income for the year shows a deficit of \$3,810,339. As the same item for last year was a favorable balance of \$4,662,758, the decrease in net corporate income for the year is \$8,473,098. The net operating revenue of \$16,973,883 is a decrease from last year of \$4,410,508;

The Stone & Webster report also says:

We find the management of the Interborough Rapid Transit company is capable and efficient.

The condition of the properties is excellent. We shall point out, however, that while expenditures for current maintenance seems to be adequate the reserves for depreciation and obsolescence, heretofore accumulated, have been exhausted and no

new reserves for that account are being made.

In order to enable it adequately to serve its territory and attain the estimated earnings, we believe it will be necessary for the company to make additional expenditures for capital purposes, chiefly equipment, amounting to approximately \$7,400,000 during the next five years, the carrying charges on which are included in our estimates. This amount may be reduced, possibly to the extent of about \$3,000,000 by savings from the construction fund.

It is manifest that a 5-cent fare falls far short of providing the cost of furnishing a ride.

The report closes by calling attention to the fact that without an increased fare the city's investment in subways cannot be self-sustaining and must be met by increased taxation, and adds:

The cost of service during the past year, including interest and sinking fund on the money invested in the property actually under operation, exceeded the net revenue by more than \$7,000,000, the loss being about equally divided between your company and the city.

With respect to the development of new lines and other additions and improvements to the service rendered to the public the year just passed was the most important in the company's history. The passenger carrying record of the system (subway and elevated) is approaching the mark of 1,000,000,000 a year, the total for the twelve months just passed being 809,335,658. The growth is shown in the accompanying table.

INCREASE IN PASSENGERS CARRIED
BY INTERBOROUGH RAPID
TRANSIT COMPANY

Year	Elevated (in round millions)	Subway (in round millions)	Total (Exact figures)
1905	266	72	339,104,820
1906	257	137	395,716,386
1907	282	166	449,287,884
1908	282	200	483,285,640
1909	276	238	514,680,342
1910	293	268	562,788,395
1911	301	276	578,154,088
1912	304	302	607,244,697
1913	306	327	634,316,516
1914	311	340	651,886,671
1915	301	345	647,378,266
1916	312	371	683,752,114
1917	349	414	763,574,085
1918	352	418	770,998,335

For the year just ended the subway carried 42,809,392 passengers more than last year, an increase of 10.23 per cent.

The elevated carried 4,472,069 fewer passengers or 1.27 per cent less than last year. This shift in traffic was due in part to the opening of the new East and West Side subway lines. The new subway lines also took traffic from the old subway, the opening of the "H" System resulting in a decrease of 68,127,085 in ticket sales in the old subway stations.

More new lines both subway and elevated were opened this year than in any other year since the Interborough Company began operation. The most important were the new Lexington Avenue extension on the East Side, the new Seventh Avenue extension on the West Side and the new Clark Street tunnel line to Atlantic Avenue, Brooklyn. There was a total increase of 15.15 miles operated at the close of the year. Of the 147.49 miles of new track covered by Contract No. 3 (executed in 1913 with the city for the development of new rapid

transit lines) 110.71 miles have been put into operation. While the city has been much in arrears in its part of the construction program practically the entire new system is expected to be in operation by the summer of 1920. The total miles of single track in use is 330.42.

The service rendered to the community shows an increase of 17,465,733 car miles, of which 14,800,651 were on the subway and 2,665,084 on the elevated. The total car mileage was 169,473,392. As part of the work of maintaining the systems in condition to give safe, dependable service 31.64 miles of new steel rails were laid and 53,368 new ties. The elevated structure was re-enforced and strengthened and much work was done in rebuilding stairways and platforms. The subway has carried more than 1,000,000,000 since it opened on Oct. 27, 1904, with a loss ratio by train accident of less than one passenger to 1,000,000,000 carried. For additions and betterments the record of the year contains a vast number of items. One of the most important was the installation of the new 60,000 kw. turbo-generator at the Seventy-fourth Street power station, and a 30,000 kw. generator in the Fifty-ninth Street power house, the last of a set of three.

Rehabilitation Planned

Rehabilitation of the Abilene (Tex.) Street Railway is proposed and plans for bringing this about are now being perfected by business men of Abilene and present owners of the traction property. The rails, franchise, rolling stock and other assets of the company were sold at public auction several months ago to George L. Paxton and G. W. Swenson, Abilene. Since that time cars have not been operated. It is now proposed that the business men of Abilene raise a fund of \$10,000 to purchase the property from the present owners, and that the property be turned over conditionally to the Abilene Gas & Electric Company. This company has indicated its willingness to spend between \$30,000 and \$40,000 in purchasing new rolling stock and putting the line in condition for operation. Conferences have been held between Abilene business men and A. Hardgrave, Dallas, vice-president and general manager of the American Public Service Company, which owns the Abilene Gas & Electric Company, looking to the carrying out of the proposed agreement.

Receiver for Suburban Line

The City & Suburban Railway, Brunswick, Ga., has been placed in the hands of temporary receivers by order of Judge Beverly Evans of the United States District Court, under a petition of the Columbia Trust Company, New York, joined by the Mutual Light & Water Company, Brunswick, the owner of the stocks and bonds of the railway company.

Samuel C. Steinhardt, New Rochelle, N. Y., and Oliver L. Mann, New York city, are the temporary receivers. The company has been ordered to show cause on Dec. 22 why the receivership should not be made permanent.

The receivership action was instituted under a mortgage totaling \$194,000 because the company failed, the petition alleges, to make proper and required deposits to the account of the sinking fund. The sum of \$3,000 is involved in this item, the petition recites.

Municipalization Authorized

Under authority of the Massachusetts Public Service Commission in an order of Dec. 11 the cities of Taunton and Attleboro and the towns of Norton and Mansfield have been empowered to purchase the Norton, Taunton & Attleboro Street Railway providing that there shall be subscribed for and purchased by these municipalities in the aggregate at least 75 per cent of all the outstanding shares of stock and bonds and that at the time of purchase, there are no notes of the company outstanding.

The valuation of the railway as determined two years ago by the Public Service Commission is about \$240,000. The Commonwealth Trust Company, Boston, is acting as agent in connection with the transference of the stock and bonds, amounting in valuation to \$120,000. Frank Babcock, city treasurer of the city of Attleboro, Mass., is acting as the representative of the municipalities.

The four municipalities served by this company have agreed to hold one quarter each of the total purchase and through their respective City and Town Councils to appoint three men each who are to serve as a board of management. The railway will be operated under the original name and until the organization of the new board has been completed continue to be under the supervision of the present management.

Committee Purchases International Collateral

The committee representing the holders of the collateral trust gold 4 per cent bonds of the International Traction Company, Buffalo, N. Y., due July 1, 1949, interest on which was defaulted Jan. and July 1, 1919, on Nov. 28 purchased at foreclosure sale collateral which had been deposited with the Guaranty Trust Company as trustee. The purchase price was \$2,000,000. The bonds authorized and outstanding to the amount of \$18,335,000, of which \$1,940,000 were pledged as collateral to the company's 6 per cent notes, were dated Nov. 1, 1912, and were a direct obligation of the company, secured by pledge of \$4,344,000 International Railway refunding and improvement mortgage 5 per cent bonds, due on Nov. 1, 1962, by the entire \$16,320,500 issued capital stock of the company and in addition \$122,000 of subsidiary company bonds.

Financial News Notes

Massachusetts Roads Extend Bonds.—The \$300,000 of 5 cent bonds of the Milford, Attleboro & Woonsocket Street Railway, Milford, Mass., due on Oct. 1, 1919, will be extended until Oct. 1, 1924, at 6 per cent.

Brunswick Officials Resign.—As a result of the placing of the City & Suburban Railroad, Brunswick, Ga., in receivership, F. D. Aiken, president of the company, and George H. Smith, one of the directors, have resigned.

New Directors for Philadelphia & Western Railway.—Albert L. Smith and C. J. Ingersoll have been elected directors of the Philadelphia & Western Railway, Upper Darby, Pa., to succeed Henry Wood and Gerald Holsman, resigned.

Towns to Defray Railway Deficit.—The citizens of the town of North Reading, Mass., at a special meeting, voted to defray the deficit incurred during the current year in operating the North Reading line of the Eastern Massachusetts Street Railway.

Abandonment Threatened in Fort Dodge.—The Fort Dodge, Des Moines & Southern Railroad, primarily an interurban road, but operating local service in Fort Dodge, has notified the Commercial Club of that city that it proposes to discontinue its service there. Service in Fort Dodge is now being given with two one-man cars.

Shore Line Lease Annulled.—The court has annulled the lease which the Shore Line Electric Railway, Norwich, Conn., had of the lines of the Connecticut Company in Eastern Connecticut, so that in the near future the Connecticut Company will have to take back these properties and operate them. The Connecticut Company has not made any plans for this as yet.

Change in Name at Rochester.—The stockholders of the Rochester Railway & Light Company, Rochester, N. Y., have voted to change the corporate name of the company to the Rochester Gas & Electric Corporation. An increase in capitalization of \$1,000,000 has also been voted, making the authorized capital of the company \$18,250,000.

Suggests City Lease Lines.—The Pacific Power & Light Company has asked permission of the Public Service Commission of Washington to abandon its railway service in Walla Walla, Wash. The commission, it is understood, has suggested that the lines be leased by the city from the company for one year at 3 per cent of the value of the property.

Railroad Foreclosure Judgment Affirmed.—The Third District Court of

Appeals has affirmed the judgment in favor of the plaintiff in the suit of The Mercantile Trust Company, San Francisco, Cal., against the Stockton Terminal & Eastern Railroad, Stockton, and J. A. Nesbitt to foreclose a mortgage executed by the trust company to the defendants to secure an issue of bonds.

Would Issue Receiver's Certificates.—The receiver of the Springfield Terminal Railway & Power Company, Springfield, Ohio, has applied to the U. S. District Court for authority to issue \$25,000 of receiver's certificates to be used for improvements to the property. The receiver states that if the issue is approved the certificates will be taken up by the bondholders' committee.

Wants Boston Elevated Appraisal.—The City Council of Boston, Mass., has passed a resolution calling for an appraisal of the Boston Elevated Railway. The resolution calls upon the corporation counsel to make a report as to whether the city of Boston has a right to secure a statement of the actual physical valuation of the elevated at the time it was placed under the control of the public trustees.

\$1,500,000 of Notes Offered.—Bonbright & Company, Inc., New York, N. Y., are offering for subscription a new issue of \$1,500,000 of one-year 7 per cent bond-secured gold notes, series B, of the United Light & Railways Company, Grand Rapids, Mich. The notes are dated Dec. 1, 1919, and are due Dec. 1, 1920. They are being offered by the bankers at 99½ and accrued interest to yield more than 7.25 per cent.

Extra Dividend at Ottawa.—An extra dividend of 1 per cent is stated to have been declared on the stock of the Ottawa (Ont.) Traction Company along with the usual quarterly dividend of 1 per cent. The Ottawa Car Manufacturing Company, a subsidiary, has declared an extra dividend of 2 per cent, in addition to the usual quarterly dividend of 1 per cent, all dividends being payable on Jan. 1 to holders of record of Dec. 15.

12.8 Per Cent Decrease in Passenger Traffic.—Higher fares, an increase from 5 cents to 7 cents, for the Illinois cities in which the Tri-City Railway operates have resulted in a decrease in the passenger traffic of 12.8 per cent. Excellent weather conditions, making possible the use of bicycles and automobiles, have prevailed since the new rates went into effect and this factor is believed to be an important one.

W. P. P. Increases Dividend.—The Washington Water Power Company, Spokane, Wash., has declared a dividend of 1½ per cent payable on Jan. 15, 1920, to stockholders of record as of Dec. 24. This is an increase over the 1 per cent quarterly rate which prevailed for the last few years. The directors of the company feel that the advance is justified because of the sub-

stantial increase in earnings and the favorable prospects for additional new business.

Payment of Bond Interest Authorized.—Special Master Lamm in the United States District Court has authorized the payment of interest on three bond issues of the United Railways, St. Louis, Mo. Payment on St. Louis Transit bonds, amounting to \$224,750, on the St. Louis Railways bonds, amounting to \$42,750, and on the St. Louis Suburban Railways bonds, amounting to \$112,500, was due on Oct. 1 for the first two and Nov. 1 for the last named.

Halts Security Exchange.—Lindley M. Garrison, receiver of the Brooklyn (N. Y.) Rapid Transit Company, has been instructed by order of Federal Judge Mayer not to enter into a contemplated exchange of securities whereby the Brooklyn Rapid Transit Company would surrender to the Equitable Trust Company first refunding bonds of the company in exchange for an equal amount of certificates of indebtedness of the Brooklyn Heights Railroad.

Abandonment Again Threatened.—The owners of the Ocean City (N. J.) Electric Railroad are still determined to "junk" the line if the city or a company does not buy the line. That determination on the part of the owners a year ago caused the city and the company to get together and effect a compromise, with the result that the electric railway was operated last summer by a trustee, the city assuming the cost of operation. The road was successfully run under these conditions.

Right to Intervene.—Federal Judge Dyer has dismissed the application of Charles H. Cole and William B. Thompson for leave to file an intervening petition in the John W. Seaman suit against the United Railways, St. Louis, Mo., referred to in the Electric Railway Journal for Nov. 15, page 953. Special Master Henry Lamm recently recommended to Judge Dyer that the petition be denied. The Seaman suit has been argued before Judge Lamm and submitted, but a decision has not been announced.

Slight Improvement by Third Avenue Company.—The Third Avenue Railway System, New York, N. Y., reports for October total operating revenue of \$1,030,115, compared with \$797,504 in October, 1918, and a deficit after total deductions of \$41,854, contrasted with \$99,243 in the same month a year ago. From July 1 to Oct. 31 the total operating revenue was \$4,085,083, compared with \$3,409,708 in the corresponding period in 1918, and a deficit after total deductions of \$134,197, against \$213,717 in the same period a year ago.

Offer Cities Service Bonds.—Henry L. Doherty & Company, New York, N. Y., and others are offering, at 100 and interest, \$10,000,000 Cities Service Company, Series "D," 7 per cent convertible gold debentures, dated Dec. 1, 1919, and maturing Jan. 1, 1966. Each \$1,000 of the new issue is convertible

on and after Jan. 1, 1922, into \$925 par value Cities Service Company preference stock and \$75 par value of the company's common stock, with all accumulated cash and stock dividends on the common from December, 1919, to the date of conversion.

Power Plants Leased.—The Pacific Gas & Electric Company has leased the plants and facilities of Sierra & San Francisco Power Company for a term of fifteen years. The Sierra & San Francisco Power Company is controlled by the California Railway & Power Company, which is in turn a subsidiary of United Railways Investment Company. It has two hydroelectric power stations in Tuolumne County and three small steam plants in other parts of the State. It now supplies power for United Railroads, San Francisco, also a subsidiary of United Railways Investment Company.

Seeks Authority for \$440,000 of New Securities.—The Nova Scotia Tramways & Power Company, Ltd., Halifax, N. S., has petitioned the Board of Public Utilities for authority to issue new securities to the amount of \$440,000. The proceeds from the sale are to be used as follows:— (a) to pay for the property of the Dartmouth Gas, Electric Light & Power Company, \$104,586; (b) to defray engineering expenses when the present company came into existence after having taken over the Halifax Electric Company, \$280,147; (c) the legal expenses connected with the formation of the company, \$56,217.

Small Property Does Well.—At a meeting of the directors of the Charlottesville & Albemarle Railway, Charlottesville, Va., on Dec. 11, a semi-annual dividend of $3\frac{1}{2}$ per cent on the preferred stock was declared, also a dividend of $2\frac{1}{2}$ per cent on the common stock, making a total of 7 per cent on the preferred stock and 5 per cent on the common stock for the year. In addition to this a considerable sum was added to surplus. The fare of the company is still 5 cents. All the cars have been painted during the year and considerable track work and overhead work done.

London & Port Stanley Issues Attractive Report.—The London & Port Stanley Railway, which was electrified and is operated by the London Railway Commission, has issued its annual report for 1916-1919, in the form of an attractively illustrated printed pamphlet of fifty-four pages. An account is given of the last four years of operation under public ownership and with hydro-electric power. An account is also included of the electrification of the line under the Beck administration. The report contains many illustrations of the property and views along the line.

Municipal Street Railway Bonds Quickly Sold.—R. M. Grant & Company, New York, N. Y., specialists in municipal bonds, have sold at 100 and interest \$2,040,000 of 5 per cent gold bonds of the city of Seattle, Wash., the principal and interest being payable

from the gross revenues of the entire municipal light and power plant and street railway systems. The bonds are issued to provide funds for the purpose of making additions, betterments and extensions to the railway and light system. The bonds are dated Sept. 1 and Oct. 1, 1919, and are due serially, the last of the issue maturing in 1939.

Banker on Pittsburgh's Problems.—Alexander C. Robinson, president of the People's Savings & Trust Company, speaking before the forum of the American Institute of Banking at Pittsburgh on Nov. 24, voiced the opinion that the Philadelphia Company, long-time parent company of the Pittsburgh Railways, is the logical interest to handle successfully the financial difficulties of the traction line, which is now in a receivership. The speaker looked with evident disfavor upon all proposals of municipal ownership of the railway. He advocated the building of a subway as a solution of the traffic congestion in the downtown section.

State Purchase of Boston Elevated Proposed.—A bill for the purchase of the Boston (Mass.) Elevated Railway has been filed with the Massachusetts Legislature by Representative William H. McDonnell of Boston. The bill provides for the purchase of the railway system through the State Trustees, who would acquire the whole or a part of the capital stock of the company, provided that 75 per cent of the stock could be obtained at a price not to exceed \$80 per share. The cost of the purchase would be met by the State and would be ultimately levied upon the cities and towns served by the system.

Wants Bridgeport Lines Segregated.—The city attorney of Bridgeport, Conn., has been instructed by the Council to ascertain the exact amount of money owing the city by the Connecticut Company as its share in the expense of constructing the Stratford Avenue bridge. He was further instructed to take the proper legal procedure for collecting the amount due. Besides, a resolution was introduced by Alderman Edward A. Drew instructing the city attorney to ascertain the action necessary to segregate the Bridgeport lines of the company from the rest of the Connecticut Company system.

\$6,277,000 Bond Issue Authorized.—The Public Utilities Commission of Ohio has granted the request of the Cincinnati Traction Company for authority to issue \$6,277,000 of twenty-five year bonds. Of this amount \$4,317,000 will bear interest at $6\frac{1}{2}$ per cent while the balance will bear 6 per cent interest. The proceeds of new issue will be used in part to reimburse Ohio Traction Company for money advanced, \$250,000 to be used as a stabilizing fund for the "service-at-cost" plan provided for in the new ordinance. The city will also be paid moneys now due it from the traction company and other indebtedness will be liquidated.

Utilities Doing Better.—In their review of the earnings statement of the Cities' Service Company, New York, N. Y., for November, the officers of the company refer as follows to the utilities: "Reports from public utility subsidiaries of Cities Service Company indicate steady progress being made in net earnings, taking the properties as a group, and while the coal strike and orders of the Fuel Administration affecting consumption of current for light may have had some slight effect, yet this was but temporary and continued progress in utility net earnings, especially those of the central station electric companies, may be expected."

Bonds Extended.—The first mortgage 5 per cent bonds of Toledo, Fremont & Norwalk Railroad, included in the Lake Shore Electric Railway, Cleveland, Ohio, which are due Jan. 1, 1920, are being extended to Jan. 1, 1925, with interest at $6\frac{1}{2}$ per cent. Under the extension arrangement the \$303,000 of bonds in the sinking fund are to be canceled so there will remain in the hands of the public to be extended \$1,197,000. The Guardian Savings & Trust Company, Cleveland, is depository and the holders of a large majority of the bonds have responded by sending in their bonds for deposit under the agreement. The extension of the bonds has been authorized by the Ohio Public Utilities Commission.

Economy Urged in Cincinnati.—In a letter to officials of the Cincinnati (Ohio) Traction Company, W. C. Culkins, Street Railway Director, urged the practice of the strictest economy and care in handling the funds at the company's disposal in order to keep within the budget approved prior to the first of the year, and to avoid the necessity of a further increase in the rates of fares. It was pointed out that, while the company's total operating expenses during the first eight months of the year were \$10,910 less than the budget allowance, yet in three specific operating accounts the appropriations were exceeded to a considerable extent. The company was requested to show reasons for these increases and, if necessary, to submit a supplementary budget.

Receiver for Northampton Traction.—Chester Snyder, president of the First National Bank of Eaton, Pa., has been appointed receiver for the Northampton Traction Company, Easton, Pa., on the application of the Northampton Trust Company, trustee for holders of first mortgage bonds of 1903. The company owns and operates the electric railways between Easton and Nazareth and Easton and Bangor. According to unofficial reports it is said that the company has outstanding \$349,000 of first mortgage 5 per cent bonds, and \$437,000 of refunding and consolidated mortgage 5 per cent bonds. The property is controlled by the same interests that control the Northampton, Easton & Washington Traction Company operating in very much the same territory.

Suit Brought to Foreclose.—Bristol & White, New Haven, Conn., as at-

torneys for the holders of the second mortgage bonds of the Danbury & Bethel Street Railway, Danbury, Conn., recently filed a petition in the Superior Court in Bridgeport, Conn., asking permission to institute proceedings to foreclose the property. The foreclosure action was directed against J. Moss Ives, the receiver. It is actually a formality in connection with the proposed reorganization of the road by the holders of the second mortgage bonds, as a measure of self protection. The representatives of the holders of the second mortgage bonds set up in their application to the court the fact that they have not received interest upon their bonds in two years. Interest is being paid on the issue of first mortgage bonds.

Wants to Fund Its Deficits.—Legislation has been introduced in the City Council of Cincinnati, Ohio, granting permission to the Cincinnati Traction Company or the Cincinnati Street Railway to fund the deficits of the former corporation aggregating \$1,500,000 over a period of twenty-five years. Under the terms of the new franchise the company is not permitted to create any obligation that cannot be repaid within twelve months. The ordinance introduced recites that the company could not comply with this provision of the franchise without increasing the rate of fare. Accordingly an amendment was sought granting permission to extend the proposed obligation over a period of twenty-five years, a sinking fund to be created which will insure the repayments of the notes or bonds by Dec. 31, 1945. The ordinance has been referred to the committee on finance.

Threaten Staten Island Suspension.—Representatives of the estate of Henry H. Rogers, which owns the Staten Island Midland Railway and the Richmond Light & Railroad Company, called on Public Service Commissioner Lewis Nixon on Dec. 20, to inform him they were ready to discontinue operation of the roads. They told the commissioner that for years they had been putting up the money to run the roads and that last month their operation cost the estate \$17,000. They said there had been an annual deficit of \$100,000 for many years. Commissioner Nixon has requested the representatives to continue operation of the roads until after a mass meeting. The companies mentioned, operate, with one exception, all the rail facilities on Staten Island, which is included in the borough of Richmond, Greater New York.

Another Discontinuance Asked.—The Boston & Maine Railroad has petitioned the Public Service Commission of New Hampshire for permission to discontinue permanently and abandon the operation of that portion of the Portsmouth Electric Railway, extending over the "Y" so called at Little Boar's Head in the town of North Hampton and known as the North Hampton branch. This line runs from Little Boar's Head to the Hampton Depot and

is little used in the winter. The railroad is also seeking authority to discontinue during the months of January, February, and March the branch line running between North Hampton and North Beach, known as the North Beach line. The railroad says that it costs more money to keep these lines clear in the winter than is taken in in fares. It was arranged to hold a hearing on the petition at Portsmouth on Dec. 16.

Ohio Company Defaults Its Interest.—Default was made in the payment of the interest due on Nov. 1 on the general mortgage bonds of the Columbus, Newark & Zanesville Electric Railway, Springfield, Ohio, which mature in 1926. A committee of the holders of the bonds in a circular issued recently says that as the railway since 1906 has been operated by another company under lease, it is of vital importance that a protective committee represent the interest of the bondholders alone, even though interest due on Nov. 1 be paid at a later date. It therefore urges holders of the bonds to forward them at once to the Land Title & Trust Company, Philadelphia, as depository. The protective committee consists of R. N. Stimson, chairman, Alba E. Johnson and Claude A. Simpler, all of Philadelphia, as counsel. The property of the Columbus, Newark & Zanesville Electric Railway was leased in 1906 to the Indiana, Columbus & Eastern Traction Company, which in turn was leased in 1907 to the Ohio Electric Railway.

Service Resumed in Morgantown.—Operation of cars on the line of the South Morgantown Traction Company, Morgantown, W. Va., was resumed during the first week of December under the direction of Aaron J. Garlow, the receiver. The line has not been in operation since the middle of October. Some time after the road was shut down the Public Service Commission granted an increase in fare. Tickets are now sold to school children sixteen for \$1 and to all others at 14 for \$1. By consent of the creditors of the company, and all others interested in the litigation in the Circuit Court for the settlement of the affairs of the corporation, a decree has been prepared and agreed to under which the receiver is to pay to the West Virginia Traction & Electric Company \$1,433 for rent of cars, rent of tracks, and electric current, used between June 1 and Oct. 15. Payment is to be made within three months out of the earnings of the road, and in case the revenues should not be sufficient, the receiver will issue his certificates to liquidate the old debt. The order has been endorsed to be entered by Judge Sturgiss when the special term of court opens.

Minnesota Line Doing Well.—According to Twin City papers the Minneapolis, Northfield & Southern Railway, formerly the Dan Patch line, has recently been doing well. This road, it will be recalled, fell upon evil days, went into the hands of a receiver, was

sold, some of its lines discontinued and the remainder put in operation under direction of the bondholders. One of the Minneapolis papers said recently: "There is a turning of the tide in the affairs of the Dan Patch line. For six months the line has been making some money. For three months it has been making good money. In order to bring the road up to requirements that are already developed, the capital stock of the road has been increased from \$500,000 to \$1,500,000. Amended articles of incorporation to permit the increase have already been filed. Not all of this new stock—half common and half preferred—will be sold at once. In order to keep up the road, some \$150,000 of borrowed money has been put in. The new stock will care for this indebtedness and enough more will be sold to provide from \$200,000 to \$250,000 in betterments, particularly more equipment. More business is now offered than the present equipment can handle. There has already been a good subscription to the new issue from directors and present stockholders. All common stock is sold at par with the preferred at practically the same figure." The property as now operated consists of 52 miles of line with thirty-two cars, most of which are in freight service.

Receivers Asked to Refund \$1,217,602.—Arthur W. Thompson, president of the Philadelphia Company, has filed a petition in the name of that company, asking that the United States District Court direct the receivers of the Pittsburgh (Pa.) Railways to refund to the Philadelphia Company \$1,217,602 and interest. The rail company, under the receivership, is in the custody of the court. The Philadelphia Company claims that the \$1,217,602 was paid by it to various of the subsidiaries of the traction company for fixed charges which the Philadelphia Company had guaranteed. The petitioner is the parent company of the Pittsburgh Railways and formed the merger which is the Pittsburgh Railways. The petition recites that during the period of consolidation, it became necessary for the Philadelphia Company to assume responsibility for the payment of some of the fixed charges agreed to in the consolidation, and, inasmuch as the receivers have refrained from the payment of fixed charges for a long time, the Philadelphia Company paid the charges it had guaranteed. The petition is a formal move to get before the court the claims of the Philadelphia Company. All the other creditors have filed their petitions covering the sums the railways owes them, and the Philadelphia Company wished to put itself in a position where its claims can legally be taken into account by the court. In view of the plea the receivers addressed to the City Council of Pittsburgh, asking a favorable attitude toward a plan for the payment by the traction company of the fixed charges, there is some disposition to feel that the railway may soon resume normal payments to creditors.

Traffic and Transportation

Birmingham's Race Problem

Company Will Try Out Twenty-Five One-Man Cars, Using New Equipment for Segregation

The receiver for the Birmingham Railway, Light & Power Company Birmingham, Ala., has twenty-five one-man safety cars on order from the Cincinnati Car Company and it is expected that they will be in operation before Jan. 1. The first sixteen of the new cars will replace eight double-truck cars now giving a thirteen-minute service on a light traffic line passing through one of the very finest residence sections of the city. This particular line has been picked for the initial installation on account of the light travel and the small percentage of negro riders.

The problem of handling the negro passengers in Birmingham is somewhat complicated by the rather loose "Jim Crow" law in Alabama. This requires that the two races shall be separated, but it does not specify whether the negroes shall occupy the front or rear of a car, as do the laws of Georgia and the Carolinas and Virginia. It so happens that the prevailing practice in Birmingham is opposite to that in the cities of the States just named. On most of the Birmingham cars, the negroes take the front of the car, entering and leaving at the front platform.

MEANS FOR SEGREGATION

In the off-center entrance cars built for the Birmingham-Tidewater Railway, now operated by the Birmingham Railway, Light & Power Company, the doors divide the cars in about the proportion of one-third at the rear and two-thirds in front, and the rear portion is assigned to the negroes. Then again, where the company runs trailers, the motor car in front is for whites and the trailer for blacks. So one has to know the ropes, so to speak.

Now the safety car with the single front exit and entrance for both races presents a new problem. The officials have decided that, contrary to the majority practice, it will be better to put the negroes in the rear. The cars will be divided in halves by omitting the two middle seats. The white people will occupy the seats in front of this open space, and the negroes those to the rear.

With all of the seats occupied, the whites will use the open space at the center of the car for standing room while the rear platform will furnish standing room for the negroes. The front platform will also provide some limited standing room for the whites. The standing space at the center of the car will be set off from the aisle by a

pipe stanchion having three vertical members. The outer two will rise to the seat height and bend horizontally to connect with the middle member, which will extend to the headlining to provide something to hang on to. It is thought that the lower wings of the stanchion will induce passengers to step around in behind it and out of the aisle, or that it will tend to set this space off so the white people will feel that this is a place reserved for them out of the way of the negroes.

Traffic Changes Suggested for Kansas City

John A. Beeler has made the first of his recommendations to the board of control of Kansas City, Mo., with respect to traffic conditions in that city. Mr. Beeler's study has extended over the entire congested district, but it has been decided to test his recommendations on a single street. The city administration, the police department and the management of the Kansas City Railways have agreed to co-operate in putting into operation Mr. Beeler's suggestions with respect to Twelfth Street. Summarized broadly the Beeler measures for Twelfth Street traffic relief fall into these eleven points:

Stopping places in the congested zone must be relocated and combined.

Double berthing must be resorted to at all stops on this street in the business district.

Vehicles must keep off the car tracks, and must move in the path between the right side of the car and the curb.

Street cars must be given precedence by traffic patrolmen. They must be passed across the intersections in pairs and simultaneously, east and west, whenever possible.

Motor car parking must be limited during the day and prohibited in the rush hours.

Additional street car collectors must be employed so as to load a double stream of passengers at the rear ends of cars.

Street car collectors must see that car doors are closed promptly when proper loads are on the cars.

Cars must stop only once at each passenger stopping place. After the doors are once closed and the car ready to proceed the doors must not be opened again.

Car patrons must assist by using street car tickets or having exact change ready, and by presenting transfers right side up and unfolded.

So far as possible cars should be operated on regular headway. Railroad crossing delays must be avoided or their effects minimized as far as possible.

The front doors of street cars must be remodeled to permit of two streams of passengers entering or leaving simultaneously.

The extreme narrowness of Twelfth Street, in Mr. Beeler's opinion, precludes the use of safety zones. He suggests, instead, that the exact spot where cars stop be marked plainly. All except one of Mr. Beeler's recommendations, that of widening the front doors of street cars, can be put into effect immediately.

It was planned to put the recommendations into effect on Dec. 20.

Illinois Commission Upheld

State Supreme Court Rules That Utilities Body Was Within Its Rights in Raising Quincy Fares

The Public Utilities Commission of Illinois has the authority to raise rates for electric railway service above the limit fixed by franchise provisions, according to an opinion of the State Supreme Court handed down on Dec. 17. The decision had specific reference to the case of the city of Quincy vs. the Quincy Railway. It sustained the action of the commission in allowing the company to install 7-cent fares on its Quincy city lines.

The Quincy Railway early in 1919 applied to the commission for permission to raise fares from 5 cents to 7 cents on the ground of increased operating expenses. The application was made in spite of the fact that the company's franchise contained a clause limiting the fare to 5 cents. After a hearing, the commission allowed the company to install the higher rate over the protest of the city of Quincy. The city carried the case to the Circuit Court of Sangamon County on the ground that the fare increase was in violation of the franchise. The Circuit Court upheld the commission. The city then appealed to the Supreme Court of Illinois.

COMMISSION'S POLICE POWERS

In sustaining the commission the court held that the latter derived its rate-making authority from the police powers vested in the State government. The decision stated the court's view in definite terms. In its opening sentence it said:

We think it has been clearly settled by the decisions of this court that the Public Utilities Commission of this State, under the public utilities act, has had conferred upon it the power of changing the rates to be charged by the public utility corporations.

After citing from previous decisions, the opinion continued:

Under these and other decisions of this court already cited there can be no escape from the conclusion that the Public Utilities Commission has the right and authority under the police powers of this State to make the change in these rates as provided in its order and as found in this record. The great weight of authority in other jurisdictions is in accordance with this conclusion.

The decision upholds the contention of Attorney General Brundage that the commission is not deterred by franchise provisions from granting a fare increase. It is therefore of wide interest in view of its possible application to the fare situation in Chicago. The city of Chicago is at present carrying on a court action against the recent 7-cent cash fare granted by the commission to the Chicago Surface Lines. The city takes the view that the decision in the Quincy case does not affect the Chicago issue, since, it is claimed, the peculiar features of the contract between the city and the Chicago Surface Lines puts the latter outside of the commission's jurisdiction. The commission takes the opposite view from that held by the city.

Back To Six Cents

Commission Again Reduces Fare on Chicago Surface Lines Pending Valuation Findings

The Illinois Public Utilities Commission on Dec. 23 issued an order, effective at midnight on Dec. 26, reducing fares on the Chicago Surface Lines to a straight 6-cent basis. Children's fares are reduced from 4 cents to 3 cents. The existing transfer privileges are continued.

The commission's ruling, which became effective on Dec. 1, leaving the cash fare at 7 cents but making possible either a 6-cent or 6.5-cent fare by the purchase of tickets, was expected to result in an average revenue of 6.25 cents per passenger. Figures submitted by the companies for the first eighteen days of December revealed that this arrangement or fares had yielded 6.85 cents per passenger.

MEANS \$22,163 DAILY LOSS

Consequently, the commission ruled that, since the company had had the benefit of the 7-cent fare during August, September, October and November, and practically a 7-cent fare during the first eighteen days of December, the 6-cent fare should be placed in effect until the final valuation of the property was completed. It is reported that the ruling of the commission will reduce the revenue of the Chicago Surface Lines \$22,163 a day or \$664,892 for the average month.

In issuing the ruling the commission said:

Experience has shown that if a ticket plan is to be really effective, the ticket must be handled by the conductors and sold to the passengers on the cars, and the time has come when the petitioners must realize that if it is necessary to fix a fare which involves a fraction of a cent they must arrange, if they are to have the benefit of this fraction, to have the tickets, which will be necessary to produce such a result, sold to the passengers on the cars.

CASH FARES PREDOMINATE

The figures submitted by the company show that during the first eighteen days of December 312,315 passengers used the 6.5-cent tickets sold in strips of ten, and 4,305,979 used the 6-cent tickets which they bought in books of fifty for \$3. The number who paid the full 7-cent fare was 31,799,289.

In commenting on the commission's ruling, Chairman James H. Wilkerson said:

The order carries into effect a ruling by the commission made in April. At that time the commission defined as a policy that the companies were entitled to earn at least \$8,600,000 a year as a return on their investment. To that policy the commission has adhered, notwithstanding criticism directed against it for ulterior motives, and to that policy it will continue to adhere.

Following the strike in July, wages were increased largely and, judged by the experience in other cities, 7 cents was necessary. But in Chicago traffic increased in the face of increased fares, so that it became necessary to put in force an average tariff of 6.25 cents. The case is still on hearing and it has been thought best in order to equalize matters to install a straight 6-cent fare.

A straight 6-cent fare leaves the companies about \$500,000 a year short of necessary revenues.

The petition of the city of Chicago for an injunction against the 7-cent fare on the Surface Lines had previously been taken under advisement by Judge McGoorty. Arguments have also been presented in the Supreme Court in another suit attacking the order of the Public Utilities Commission.

Newark to Regulate Buses

As a first step toward municipal control of jitney traffic on its streets the city of Newark, N. J., has entered into a contract with the General Omnibus Company of New Jersey for the operation of buses over half a dozen routes. The validity of the contract, which was attacked by the Public Service Railway, has been approved by the courts and within a short time operation under the agreement will begin. The company plans to put into service buses of the double-deck type.

The contract fixes the fare at 5 cents for a continuous ride within the city limits, but provides that the fare may be raised to 10 cents at the discretion of the city authorities. Under the agreement each bus will be covered by a separate insurance policy of \$5,000. Besides the insurance policies victims of accidents will also have the assets of the corporation to fall back on to satisfy judgments. The company will be required to pay 5 per cent of its gross receipts to the city, the minimum tax being set at \$8,000 for the first year, \$10,000 annually during the next four years, \$12,500 for the next five years, and \$15,000 for the last five years of the contract.

Five-Cent Zones on Worcester Lines

A zone system based on a 5-cent fare for a ride in each zone, became effective on the lines of the Worcester (Mass.). Consolidated Street Railway on Dec. 1. Under the new arrangement, which is to be given a thirty-days' trial, the Worcester City Hall becomes a pivot point from which rates are computed. From the city limits or natural terminals to the City Hall, the fare is 5 cents, while for a passenger continuing beyond the latter point it is 10 cents. The company's suburban lines are also zoned.

The terms of the new system were recently agreed upon at hearings before the State Public Service Commission. The plan was endorsed by twenty of the outlying towns served by the company, only two towns, Shrewsbury and West Bolyston, raising objections. Transfers are discontinued. The fare was formerly 7 cents with free transfers.

A representative of the company declared at the hearings before the commission that an increased revenue of \$840,000 on the system was needed. Of this amount he stated that \$277,000 was needed to meet the deficit occasioned by the rates which have been in

effect since April 1 last, and the remainder to take care of the extra sum needed for increased wages.

Whitman Jitneys Upheld

The action of the town of Whitman, Mass., in barring jitneys from its streets was overruled on Dec. 3 when Judge George W. Kelly of the District Court ordered dismissed the case against Jason E. Cushing and three other jitney drivers charged with operating their vehicles in Whitman without licenses. The court held that the regulation recently adopted by the Whitman board of selectmen forbidding licenses to jitneys to compete against the Eastern Massachusetts Street Railway could not be sustained because it discriminated against the jitneys.

The case was an outcome of the recent move on the part of the Whitman selectmen to keep jitney buses from the town to save the electric car service. Judge Kelly in his decision said that no town could pass a by-law which discriminated against competition between persons engaged in the same line of business. Under the by-law, the court decided that no one could drive through the town of Whitman with a vehicle for hire without first securing a license in the town of Whitman, so that under this section, the court ruled, the requirements of the license could not be sustained.

Zone Fare Loss \$1,500,000

The experiments which it made with the zone fares cost the Public Service Railway, Newark, N. J., \$1,500,000. This is the loss stated by President McCarter to have been sustained in the announcement making public news of the passing of the dividend on its common stock by the Public Service Corporation for the last quarter of 1919, referred to briefly in the ELECTRIC RAILWAY JOURNAL for Dec. 20, page 1017. Mr. McCarter's statement follows:

In view of the difficulties which the gas company and the railway company, two of the corporation's three principal subsidiaries, have encountered during the current year, in endeavoring to meet the vastly increased costs of labor and material under insufficient rates, and especially in view of the loss sustained by the railway in the zone system experiment, amounting approximately to \$1,500,000, now happily concluded, the board of directors of the corporation, after a full consideration of all the facts, has thought it prudent to omit the declaration of what would have been, under normal conditions, the last quarterly dividend upon its common stock for the current year. This is thought wise as well from the standpoint of the conservation of cash resources as from a consideration of the earnings statement.

The corporation looks forward to the new year and to the future with confidence. The electric company and the gas company, with their existing rates, are functioning under fair conditions, and the railway, under present costs, with the 7-cent fare, should be self supporting; that is to say, able to pay its operating expenses, including depreciation and fixed charges.

The valuation of the railway property devoted to the public use is nearing completion by the Board of Public Utility Commissioners and early in the coming year a permanent rate should be established, based on the law and the evidence in the case; the result of which should be to enable the corporation to earn a fair measure of return upon its large investment represented by the stock of the railway.

Transportation News Notes

Suggests Compulsory Accident Prevention Education.—Legislation making instruction against accidents one of the compulsory features of public school education was recommended strongly by Cecil G. Rice, of the associated bureaus of the Pittsburgh (Pa.) Railways in an address on Dec. 6 before the Western Pennsylvania division of the National Safety Council.

Children in Arms Free.—New rules which went into effect on the Seattle (Wash.) Municipal Railway on Dec. 15, provide that only "children in arms" shall be carried free. The rule is provided for in an ordinance passed by the City Council on Nov. 4. It supplanted a previous rule that children five years or under should have free transportation.

Will Reroute Baltimore Lines.—A general organization of the transit system of Baltimore, Md., is called for in plans being worked out by the United Railways & Electric Company. The company will reroute every car line in the city, with the view to the eventual installation of a complete rapid transit system. The city will co-operate in carrying out the scheme.

Would Raise Interurban Rates.—The Maumee Valley Railways & Light Company, Toledo, Ohio, has filed with the State Public Utilities Commission a proposed schedule increasing rates between Toledo and Perrysburg, Maumee and intermediate points. Single fares are increased 5 cents. The advance in the price of commutation books amounts to 50 per cent.

Free St. Louis Transfers May Go.—Rolla Wells, receiver for the United Railways, St. Louis, Mo., recently announced that he would shortly ask the State Public Service Commission for authority to make a separate charge for transfers on the company's lines. Mr. Wells stated that, in his opinion, the solution of the transit problem of St. Louis depended largely upon the abolition of free transfers.

Glen Cove Company Needs More.—C. L. Addison, vice-president of the Glen Cove (N. Y.) Railroad, on Dec. 17 notified the Glen Cove City Council and the Nassau County Board of Supervisors that, unless the company were granted an increase in fare it would suspend operation. Last September the company asked for a modification of its franchise to permit it to ask the Public Service Commission for higher rates.

Eight Cents in Mansfield.—The Richland Public Service Company, Mansfield, Ohio, has notified the Mansfield municipal authorities that beginning

Jan. 1, 1920, it will charge 8-cent cash fares. The company proposes to issue seven tickets for 50 cents. The rates are to continue in effect for six months and, under the terms of the company's franchise, will then be subject to revision.

Miners' Ticket Rate Lowered.—The Public Service Commission of Pennsylvania has issued an order directing the Eastern Pennsylvania Railways, Pottsville, to reduce the cost of ticket books for miners from \$3.50 to \$3. The order further directs that a traffic check be kept on the zones affecting Coaldale, Summit Hill and Brockton, and that a report be submitted to the commission next February.

Newspaper Rates Raised.—The Public Service Commission of Ohio has authorized the Cleveland & Eastern Traction Company and the Cleveland & Chagrin Falls Railway to install a rate of 0.75-cent a pound for the transportation of newspapers. The commission had previously suspended a rate of 1 cent a pound, the present rate being 0.5-cent. The new rate becomes effective on Jan. 1, 1920.

Ten Thousand Collisions in Detroit. Cars of the local and interurban lines of the Detroit (Mich.) United Railway were involved in more than 10,000 collisions with motor-driven vehicles during the first ten months of 1919, according to figures recently made public by the company. The financial loss resulting from these collisions, which averaged thirty-three a day, amounted to approximately \$250,000.

Baltimore Fare Order Modified.—The Public Service Commission of Maryland has set Oct. 1, 1920, as the date on which the present 7-cent cash fare shall cease to be effective. The commission has ruled in a supplementary order that, subject to modification, the former 6-cent fare shall be restored on Oct. 1, unless the company before that date has applied for a continuation of the present rate or for a higher one.

Six Cents in Sedalia.—The Public Service Commission of Missouri has made an order increasing the railway rates of the City Light & Traction Company, Sedalia, Mo., from 5 cents to 6 cents for adult passengers and from 2.5 cents to 3 cents for children. The new rates will remain in force for thirteen months. Meanwhile, the company is directed to file a valuation of its property holdings with the commission.

Pennsylvania Bus Line Halted. The Public Service Commission of Pennsylvania has ordered the discontinuation of a motor bus line operating between Easton, in Northampton County, and Riegelsville and Kentnersville, in Bucks County. The bus company had failed to obtain a certificate of public convenience. The commission took action on the complaint of the Philadelphia & Eastern Electric Railway, Doylestown, with which the bus line competed.

Express Service on Bay State Lines.—The Eastern Massachusetts Street

Railway, Boston, Mass., will institute a freight service shortly throughout its system in Essex County, Mass. The plans provide for the maintenance of both day and night lines which will link up with the lines now operating south of Boston and thus establish connections with the Providence and Fall River boats for through freight to New York.

Seven Cents Asked in Nashville.—The Nashville Railway & Light Company, Nashville, Tenn., has petitioned the State Public Utilities Commission for an increase in fare to 7 cents. The increase is asked pending an investigation of the company's financial condition by a board of three members, representing respectively the company, the commission and the city of Nashville. Upon the findings of this board a permanent rate would be based.

Interstate Zone Fares Raised.—The Interstate Commerce Commission recently granted the Washington Railway & Electric Company, Washington, D. C., and its subsidiaries, the Washington & Rockville Railway, the City & Suburban Railway and the Washington-Interurban Railroad, a flat increase of 1 cent in cash fare per zone on their lines in Maryland. The application for an increase was filed with the commission some time ago. The new fares became effective on Dec. 1. They will expire on May 1, 1920.

Jitneys Barred in Salem.—Following the cutting-off of electric railway service in Salem, Peabody and Beverly, Mass., by the Eastern Massachusetts Street Railway, the Councils of these municipalities have voted to revoke licenses for the operation of jitneys within the city limits. The company resumed service on Dec. 19 after an interruption lasting one day, in which the inability of the jitneys to handle the traffic was made clear. The action of the company was in accordance with the policy of refusing to operate in competition with the jitneys. The elimination of the latter from the Salem division leaves the Bay State system without jitney competition in the eastern district of Massachusetts, with the exception of Quincy.

Eight Cents Now Charged in Kansas City.—The Kansas City Railways on Dec. 14 began collecting 8-cent cash fares on its lines in Kansas City, Mo., under authority of the State Public Service Commission. The ticket-rate, when five or more tickets are purchased at once, remains at 7 cents. Metal tokens are sold on the cars at the rate of two for 15 cents. The cash and ticket rates were formerly 7 cents. P. J. Kealy, president of the company, recently stated that a sixty-day trial of the 7-cent cash fare had demonstrated that the public would not buy tickets when the cash and ticket rates were the same. The fare in Kansas City, Kan., remains at 6 cents. Two cents additional are collected from passengers crossing the line from Kansas into Missouri.

Personal Mention

L. O. Lieber, electrical engineer of the Los Angeles (Cal.) Railway, has resigned. Mr. Lieber plans to enter other business. He has been connected with the company for the last eleven years.

Thomas A. Cole has resigned as claim agent of the Los Angeles (Cal.) Railway. Mr. Cole had been identified with the company for more than twenty-five years. He will devote his time to private business.

C. M. McRoberts has been appointed claim agent for the Los Angeles (Cal.) Railway, succeeding Thomas A. Cole, retired. Mr. McRoberts has been assistant claim agent of the company for the last eight years.

J. H. Suttlee has been appointed master mechanic of the Johnstown (Pa.) Traction Company. Mr. Suttlee was formerly master mechanic of the Trenton, Bristol & Philadelphia Street Railway, Philadelphia, Pa.

I. C. Shellenberger has been appointed auditor of disbursements of the Chicago (Ill.) Surface Lines to succeed A. L. Dewey, who died recently. Mr. Shellenberger was formerly chief clerk of disbursements, and has been succeeded in that position by C. W. Meyer.

Alexander McDonald has been appointed traffic superintendent of the Winnipeg (Man.) Electric Railway. Mr. McDonald succeeds R. R. Knox, whose promotion to be assistant to the general manager of the company is noted elsewhere in these columns. He has been connected with the Montreal (Que.) Tramways since 1887.

R. G. Staplin, claim agent for the Shore Line Electric Railway, Norwich, Conn., has resigned to accept a similar position with the Hartford Accident & Indemnity Company, Hartford, Conn. Mr. Staplin joined the company on Oct. 1, 1913. Mr. Staplin is a member of the New England Street Railway Club and the National Safety Council.

Harry Clark, who has been engaged for the last twenty-five years in electric railway management in New York State, has resigned as treasurer and assistant general manager of the Empire State Railroad, Syracuse, N. Y., to become associated with the Watson Products Corporation, manufacturers of automobile trucks and accessories.

S. M. Gallaher, who has been manager of railways of the Monongahela Valley Traction Company, Fairmont, W. Va., since 1917, has severed his connection with the company to join the Cleveland (Ohio) Electric Illuminating Company as head of the engineering and construction departments. Mr. Gallaher was formerly general manager of the Charleston (W. Va.) Interurban Railroad.

Mr. Gaboury Elected

Official of Montreal Tramways Chosen to Head Canadian Electric Railways Association

Arthur Gaboury, superintendent of the Montreal (Que.) Tramways, was elected president of the Canadian Electric Railways Association at the Association's recent meeting. At the Atlantic City convention of the American Electric Railway Transportation & Traffic Association he was elected to its executive committee. Mr. Gaboury, who is in his forty-sixth year, has al-



ARTHUR GABOURY

ways lived in Montreal and has from his boyhood been connected with the local electric railway systems. After completing his college course at St. Laurent College, he went to work in 1894 first as conductor and then as motorman with the Montreal Street Railway to gain a full knowledge of the practical end of the transportation business.

In 1901, on the occasion of the visit of the Duke of York to Montreal, he was appointed assistant inspector to aid in the handling of the extra traffic occasioned by this visit, and soon thereafter became depot clerk at the central carhouse. A few months later he was transferred to important new carhouses at St. Denis Street as chief clerk, having charge of the suburban line to Sault au Recollet.

In 1903 the claims department of the railway was separately organized and Mr. Gaboury was put in charge as claim agent, which position he retained until 1906 when he was made assistant superintendent. A year later he became superintendent.

In his position as superintendent Mr. Gaboury has had an active part in all movements looking toward the im-

provement of electric railway service, such as the proper training of employees, the safety campaign, the regulation of street traffic, etc. He has been a member of the Canadian Electric Railways Association, which he now heads, since 1903, and has filled positions of greater and greater importance in the association since that year. He is equally interested in the American Association.

R. R. Knox, traffic superintendent of the Winnipeg (Man.) Electric Railway, has been promoted to be assistant to the general manager of the company. In his new capacity Mr. Knox will be attached to the office of A. W. McLimont, vice-president and general manager, for special assignments. He has been connected with the transportation business in Winnipeg since 1895, and for the last twenty-one years has held the position of traffic superintendent. His new appointment has met with the whole-hearted approval of the Winnipeg public, since Mr. Knox has taken a leading part in municipal affairs for many years. He has been a member of the Winnipeg School Board since 1908.

J. F. Trazzare has been appointed to the position with the Georgia Railway & Power Company, Atlanta, Ga., formerly held by W. T. Waters, publicity agent. Mr. Trazzare's appointment contemplates the organization of a new department of the company to be known as the employment and public relations department, of which he will have charge. Previous to the war, Mr. Trazzare was with The Aluminum Company of America, where he had to do with the broad phases of labor. Before that he was a newspaper man for a number of years. During the war he served the War Department in connection with the industrial plant protection work of the Southeastern Department. While he has spent much time in publicity work, this is his first engagement as a publicity agent and his first connection with the electric railway field.

D. H. Blanks, who has been chief engineer of the Monongahela Valley Traction Company, Fairmont, W. Va., for the last three years, has been appointed manager of railways of the company. Mr. Blanks was graduated from the University of Missouri in 1906 with the degree of civil engineer. He spent several years in construction work for various steam roads, first with the Pennsylvania Railroad, later with the New York Central & Hudson River Railroad and still later with the Long Island Railroad. He then went to Mexico, where he was employed by the Southern Pacific Railroad on engineering work. He subsequently became connected with the Carter Construction Company, for which he was engaged in building the line between Cumberland and Connelville for the Western Maryland Railroad. In 1916 he joined the Monongahela Valley Traction Company as chief engineer.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,

SALESMAN AND PURCHASING AGENT.

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

Stocks of Wood Tie Preservatives Are Low

Production Cut Down by Labor Scarcity—Usual Fourth Quarter Slackness Apparent—Decline in Sales

Recent sales of wood tie preservatives show a decided falling off. Although the fourth quarter is usually a period of dullness, it is particularly so this year because of the scarcity and unproductiveness of labor.

Present stocks of materials are very short and although it is replenished continually, producers are finding it difficult to quote on large quantities for spring delivery. Production is behind and has been hampered somewhat from strikes.

Buying is of an irregular nature and although prices have not advanced for some time there is rather an inclination more towards an advance than toward a reduction of prices for first quarter.

Market conditions are firm on creosote oil which is the base of most preservatives. Business has been fairly active and some contracts for first and second quarter have been signed by large producers although the price was not given. There is very little creosote available in the market at present. Prices are unchanged at 40 cents per gallon for the 25 per cent grade and 20 cents per gallon for the 15 per cent grade.

Deliveries to railways on medium-sized quantities of wood tie preservatives can be made in from one to two weeks.

Metal Market Situation

Copper Selling at 18.25 to 18.50 Cents a Pound from Producers, With Outside Market Higher

Since the last metal market report numerous changes have occurred in the price of metals. Electrolytic copper, under date of Dec. 23, is being sold by producers at 18.25 to 18.50 cents a pound for delivery at buyers' works. The unusual feature of this market is the higher price which the outside market places on its copper. These dealers have established premiums of 1 cent or more per pound for deliveries over the first and second quarters of next year. Their first quarter quotations are 19.25 to 19.75 cents and second quarter 19.75 to 20.75 cents a pound. Producers are refusing to sell to the outside market of dealers, preferring to deal directly with the consumer.

The prices three weeks ago were as low as 18 cents a pound, the lowest at which the metal could be bought since

its rise of several months ago. During this recent downward turn of the market from the 23½-cent level, some large sales of the red metal have been made, and consumers in many cases have covered their requirements to a considerable extent. Of course, production in some mines has decreased in the last month, and a continued coal shortage will force further reduction, it is said.

In some cases consumption during the past few months has been about on the level of production, even where this production has been normal. Prices, of course, have been sacrificed in this buying. Present domestic consumption of copper is estimated about 30 per cent greater than that before the war,

the wire drawers and electrical industry being the greatest consumers. The foreign orders are, of course, very low because of the unfavorable exchange situation.

The market for copper scrap is 1½ cents lower, commensurate with the new metal prices, and heavy wire and copper scrap is quoted at 16.50 to 17 cents.

Lead prices were advanced on Dec. 6 \$3 a ton, bringing the New York price up to 6.90 cents a pound. The market is strong and producers are well booked up. The outside market holds quotations up to 10 points above that of the American Smelting & Refining Company.

Active Interest Shown in Steel Ties

Inquiries Good With Average of Sales Light—Good Delivery Quotations Now Although Future Uncertain

Reconstructed and extended track mileage is expected to be less this year than ever before. This has been partly responsible for the falling off of sales in mechanical ties. Most of the work which has been done during the past year has been forced reconstruction on pavement improvements or on account of franchises.

Present market conditions for mechanical ties show an improvement over the earlier part of the season. One manufacturer is accepting orders for mechanical ties based on the present price of steel, the shipments to be made at any time during the spring construction season. Prompt deliveries are the rule at present, although orders now pending are expected to cut quite deeply into present stocks.

Raw material contracts have been fairly well taken care of by the steel manufacturers although deliveries are gradually becoming lengthened. Only one mill is making delivery at present in less than a month, the majority of others being from six weeks to three months.

Although prices are about the same as last spring and manufacturing conditions are good, it is impossible to predict for the future on account of the condition of the steel industry. For the time being, however, present prices will be maintained although there may be revisions during the first quarter of 1920. A spurt in business is looked for beginning about the first of February and continuing throughout the year.

A considerable number of railways expect to commence using mechanical ties for the first time this year, while a number of others, who have completed several miles of concrete construction,

will build extensions. Labor for track work has been scarce and can be obtained only at a prohibitive figure. There has been no difficulty in getting rails except that this year the railways have not been able to finance rail purchases and relaying rails have been rather hard to obtain.

Good Deliveries Being Made On Trolley Wire

Prices Are Holding Firm on the Finished Product—The Demand Is Only Fair

Small sales of copper wire for trolleys and transmission are the rule nowadays. The buying has been reduced to a maintenance basis and very little new construction that requires either trolley or transmission copper is being undertaken. An order placed last week for ten miles of copper trolley is the best reported for several weeks although in former times, orders for this or larger amounts were regular and rather commonplace. Copper has dropped off considerably from the war time prices of 23½ cents, and at present is holding around the 18½-cent level but this has not been sufficient to cause a drop in the finished product, the price of which remains unchanged according to latest reports. Labor is a big item and therefore has an important bearing on the cost of the finished wire.

Stocks of copper have been permitted to dwindle but at no time has there been a shortage or failure on the part of the manufacturers to make prompt delivery. This no doubt has been due to the small amount that is being purchased.

Sales of composition copper and brass trolley wire have been good and are reported to be 25 per cent ahead of last year's sales. Business is fairly regular all throughout the year, and as a matter of fact, the sales during August, September, and October on this wire have increased considerably over the corresponding months of last year and the prospects are that sales for this winter will be even better. Stocks are unlimited and any demands can be met that are placed upon the manufacturers.

Prices are dependent upon the cost of ingot copper, although labor is largely a controlling factor. The present tendency of the price, however, is to follow that of ingot copper. Large individual orders have been placed and deliveries at no time have been held up by manufacturing conditions. At present deliveries are four to eight weeks on large orders, although where customers have emergency requirements, they are taken care of immediately.

Rolling Stock

Ashtabula (Ohio), Rapid Transit Company is expected to be in the market for new cars. M. H. Turner, City Manager, is in charge of the property.

Omaha, Lincoln & Beatrice Railway, Lincoln, Neb., has placed an order with the American Car Company for two double truck cars for delivery about March 1. The cars will be equipped with Westinghouse 508 motors, General Electric C P 27 compressors, Brill 71-1 trucks and with 26 in. Carnegie steel wheels. The cars are to be used on an extension between Lincoln and Havelock, Nebraska, which will be completed by the time the cars arrive.

Franchises

Atlanta & Anderson Electric Railway, Atlanta, Ga.—The charter of the Atlanta & Anderson Electric Railway, which proposes to build an electric railway from Atlanta to Anderson, S. C., has been extended for a period of three years.

Los Angeles (Cal.) Railway Corporation.—The Los Angeles Railway Corporation has applied to the City Council, for a franchise to maintain and operate a double track on the newly opened portion of Broadway, from Tenth to Rico Streets.

East St. Louis & Suburban Railway, East St. Louis, Ill.—The East St. Louis & Suburban Railway has been authorized to use the streets of Belleville, Ill., east of 23rd Street during the month of December for the sum of \$200. The permit was given in lieu of a franchise.

Northern Texas Traction Company, Fort Worth, Tex.—The Northern Texas Traction Company, a Stone & Webster property, has been granted a franchise by the city commission of Fort Worth,

for double tracking its line on East Terrell Avenue from Forest Avenue to Evans Street, Fort Worth.

Track and Roadway

Sacramento Northern Railroad, Sacramento, Cal.—The right-of-way of the Sacramento Northern Railroad from Telama to Red Bluff has been purchased by the Sears & Horning Company. The right-of-way from the Sacramento River to St. John, in Glenn County, has been sold to the same company. The Northern Realty Company, holding company for the Sacramento Northern Railroad has also sold a site, at the corner of Oak and Ninth Streets, Chico, Cal.

Capital Traction Company, Washington, D. C.—J. H. Hanna, general manager of the Capital Traction Company, has announced a comprehensive improvement program for the company. It is planned to spend \$1,100,000 on new equipment and track construction. The company will purchase forty new cars at a cost of \$500,000, will repair and relay tracks at a cost of \$300,000 and will install additional power house equipment at a cost of \$300,000.

Rock Island Southern Railway, Rock Island, Ill.—The Rock Island Southern Railway has been directed by the Public Utilities Commission of Illinois to repair all dangerous bridges; to secure sufficient power to operate its cars on schedule time; to re-surface the tracks of the Aledo and Alexis branches; to repair and maintain its passenger cars in safe and sanitary condition; to repair all of its pole lines and to maintain suitable terminal facilities at Rock Island.

Tri-City Railway, Davenport, Ia.—The Tri-City Railway will build 1800 ft. of trackage on Twenty-seventh Street, south of Fifth Avenue, Moline, Ill.

United Railways of St. Louis, St. Louis, Mo.—Petitions signed by 6000 residents of Lindenwood and Gratiot, in the southwest section of St. Louis, have been presented to Rolla Wells, receiver for United Railways of St. Louis, asking for the extension of the company's system to those districts. The petition suggests that the Tower Grove line be extended for one mile west of its present turning point at Woods and Arsenal Streets to either Ivanhoe or McCausland Avenue and south on either one of these thoroughfares to Lindenwood Place. The length of the proposed extension would be two and a half miles.

Ocean City (N. J.) Electric Railroad.—The State Board of Public Utility Commissioners has granted permission to the Ocean City Electric Railroad to surrender its franchise and abandon certain of its tracks in Ocean City.

Public Service Railway, Newark, N. J.—The New Jersey Board of Public Utility Commissioners has approved the ordinance passed by the Board of Public Works of Paterson on Sept. 23 last providing for the removal of cer-

tain tracks of the Public Service Railway on Sumner Street, between Clay and Essex Streets; Essex Street, between Sumner and Beach Streets; Beach Streets, between Essex and Market Streets, and Market Street, between Beach and Straight Streets.

Cincinnati, Lawrenceburg & Aurora Electric Street Railroad, Cincinnati, Ohio.—The Cincinnati, Lawrenceburg & Aurora Electric Street Railroad is seeking a direct entrance to Cincinnati. The plan contemplates construction of a line from Anderson's Ferry to the Dixie Terminal in Cincinnati. The cost of a direct entrance is estimated at \$750,000.

Dallas (Tex.) Railway.—The Dallas Railway which, under the terms of the franchise granted two years ago, is under bond to construct within a specified time two interurban lines each 30 miles or more in length, has been granted an extension of time in which to begin work to Jan. 8, 1920.

Dallas (Tex.) Railway.—Richard Meriwether, general manager of the Dallas Railway, has announced that all improvements, extensions and betterments now under way in Dallas will be completed by Jan. 1, 1920. These include the rebuilding of the Jefferson Avenue line from Lancaster to Polk, a distance of nearly 2 miles; rebuilding part of the line on McKinney Avenue, and the extension of a line to Oakland Cemetery out Myrtle Street.

Virginia Railway & Power Company, Richmond, Va.—The Virginia Railway & Power Company will expend approximately \$85,000 on improvements to its lines in Portsmouth, Va. The improvement program was recommended by Burton Marye, engineer of the State Corporation Commission.

Power Houses, Shops and Buildings

Pacific Electric Railway, Los Angeles, Cal.—The Pacific Electric Railway has opened large car shops in Torrance, Cal. The buildings at Seventh and Alameda Streets, Los Angeles, formerly used as car shops, will be used as a freight depot.

Boston (Mass.) Elevated Railway.—The Boston Elevated Railway has placed in service its new Back Bay loop terminal. Surface cars from the Harvard Square, Dudley Street and Chestnut Hill sections will pass through the loop, which has entrances on Boylston and Newbury Streets.

Northern Massachusetts Street Railway, Athol, Mass.—Damage estimated at \$100,000 was caused to the car house and contents of the Northern Massachusetts Street Railway at Orange, Mass., on Nov. 23 by a fire believed to have been caused by spontaneous combustion in a coal pile.

Texas Electric Railway, Dallas, Tex.—The Texas Electric Railway has purchased the Union Telephone Building at McKinney, Tex., from the Southwestern Telephone Company and will

shortly begin the erection of an additional building to be used as a terminal. Separate waiting rooms for whites and negroes will be provided, as well as comfortable quarters for trainmen. It is expected that the new station will be ready for occupancy about Jan. 1, 1920.

Trade Notes

J. Benton Porter, ship-propulsion specialist, has been transferred from the Philadelphia office to the New York office of the General Electric Company.

Edward Wray, assistant general manager of the Sangamo Electric Company during the past two years, has resigned, effective Sept. 1, on account of ill health.

William L. Swormsted has been appointed manager of the Washington office of the Westinghouse Lamp Company, succeeding C. R. Whitney, resigned.

Westinghouse Electric & Manufacturing Company announces the appointment of Vernon R. Buxton to the Boston sales office as switchboard specialist in the supply department.

George F. Simons, who recently was district manager for the Detroit and Cleveland offices of the Edison Storage Battery, has resigned to enter the industrial truck field.

Lakewood Engineering Company, Cleveland, Ohio, is offering three awards, totalling \$1,750, for the three best analyses of the application of its new Tier-list truck.

Jensen & Garlock, Chicago, Ill., have formed a partnership and will make financial investigations, installations of systems, and will specialize on federal income, capital stock and state taxes.

Gibb Instrument Company, Detroit, Mich., announces the discontinuance of its line of electric pyrometers in order to confine its efforts entirely to the manufacture of welding apparatus.

Ingersoll-Rand Company, New York, N. Y., has established a branch office in Dallas, Tex., in charge of R. H. Brown, Jr., who has been connected with the St. Louis office for several years.

Chicago Pneumatic Tool Company on Oct. 1 removed its Birmingham office from the Brown Marx Building to 1925 Fifth Avenue, North, where a service station and complete stock will be maintained.

H. M. Bylesby & Company, Chicago, Ill., announce that General George H. Harries, who recently returned to this country after twenty-seven months active service in the U. S. Army, has resumed his duties as vice-president of the company.

Thomas S. G. Menezes, 12 Depot Lines, Karach, India, desires catalogs from engineering firms wishing a representative in Mesopotamia. On demobilization of the Mesopotamian Expeditionary Force he intends to do business in Basrah and Bagdad.

Russell Stoll & Company, New York, N. Y., have opened a Chicago office with Roy E. Shawlin as Western manager. The Chicago office will establish distribution in the Middle West on fittings, fixtures and electrical specialties.

General Electric Company, Schenectady, N. Y., recently distributed a semi-annual bonus amounting to approximately \$75,000 among 2000 employees of its Pittsfield, Mass., works. All of the 2000 employees have been with the company for a period of five years or longer.

Yarnall-Waring Company, Chestnut Hill, Philadelphia, manufacturer of power-plant devices, announces that L. G. Chase, formerly efficiency engineer, Rosemary Manufacturing Company, Rosemary, N. C., has been appointed mechanical engineer of this company.

Jeffrey De Witt Insulator Company, Huntington, W. Va., announces that W. D. A. Peaslee, formerly professor of electrical engineering of the Oregon Agricultural College, has joined the staff of the company. Mr. Peaslee was a captain in the engineers during the war and saw service in France.

Richardson-Phenix Company, Milwaukee, Wis., announces the appointment of L. E. Strothman as vice-president and general manager of the company. For the past several years he has been manager of the steam turbine and pumping department of the Allis-Chalmers Manufacturing Company.

The Parsons-Moorehead Machinery Company, Hostetter Building, 237 Fourth Avenue, Pittsburgh, has been organized to do a general machinery business. William L. Moorehead of this company was formerly vice-president of the Duquesne Electric & Manufacturing Company, while Mr. Parsons has been doing a general machinery business for several years.

The Chattanooga Armature Works, Chattanooga, Tenn., has just completed a portion of its plant, making an addition of 3000 sq.ft. to its floor space. The old frame building was removed and brick construction substituted. It has now complete repair shops to take care of electrical machinery and special coils. The company manufactures armatures and field coils for the different makes of motors and generators and represents the Van Dorn Electric Tool Company and the Lincoln Bonding Company, both of Cleveland, Ohio.

Hyatt Roller Bearing Company, New York City, announces the appointment of Earl E. Eby, sales manager of the industrial bearings division, to the board of directors of Hyatt, Ltd., a new company formed to market the Hyatt bearing in Europe. Mr. Eby will devote his entire time to this work, with headquarters in New York. G. O. Helmstaedter, formerly Chicago district manager, has been promoted to the position of sales manager to fill the vacancy.

Canadian Westinghouse Company, Ltd., announces that H. U. Hart, chief engineer of the company, has been ap-

pointed general manager, succeeding Mr. Merrick, resigned. Mr. Merrick, however, remains vice-president and a member of the board of directors of the company. C. H. Mitchell, formerly assistant superintendent of electrical department, has been appointed assistant manager of the Canadian company's works. R. E. Cullings has been appointed general foreman in charge of the electrical department at the Essington works. H. C. Thomas has been appointed assistant to the manager of the St. Louis office.

Janette Manufacturing Company, Chicago, Ill., manufacturer of alternating-current and direct-current motors and motor-generators, is moving into its new factory building at 556 West Monroe Street. This is a seven-story and basement building, comprising 60,000 sq.ft. of floor space, or about six times the amount of floor space occupied in the old West Jackson Boulevard Building. In addition to increased space, the company is adding considerable new equipment for a much larger production. In order to satisfy the present demand, the output will be increased at least 500 per cent, according to advices from the Janette company.

New Advertising Literature

Vitreous Enameling Company, Cleveland, Ohio: An illustrated leaflet describing its R. L. M. standard industrial lighting reflectors.

Inter-State Machine Products Company, Inc., Rochester, N. Y.: Bulletin No. 500 describing its Sterling electric siren fire alarm.

Tubular Woven Fabric Company, Pawtucket, R. I.: A booklet "Proof of the Pudding," or on giving the advantages of Duraduct portable cable.

Roller-Smith Company, New York, N. Y.: Revised bulletin sheet No. 96, which covers its Columbia switchboard-type induction watt-hour meters.

The Cutler-Hammer Manufacturing Company of Milwaukee, Wis.: A leaflet telling about its line of alternating-current and direct-current drum controllers.

Condit Electrical Manufacturing Company, South Boston, Mass.: Bulletin No. 414-2 on type E-4 oil switches and circuit breakers, whose maximum ampere capacity has recently been increased to 800.

Allis-Chalmers Manufacturing Company, Milwaukee, Wis.: Bulletin on the Diesel oil engine, with an explanation of the principles of this type engine, and with details of the engine alone and as installed in power plants.

Nachod Signal Company, Inc., Louisville, Ky.: Illustrated bulletin on type-CD signals, intended for electric railways of nominal 600-volt line potential, equipped with wheel or sliding shoe trolley. The signals are adapted for two-way movements on single tracks. The bulletin carries catalog number 719.



A Peacock for Every Need

NO matter what weight type or style of car you are now using we have a Peacock Brake that we can thoroughly guarantee and recommend to be strong—positive and instantaneous in action.

Once a user always a user. Many motormen prefer to use the Peacock instead of the air even when the cars are equipped with Air. Numerous Railways equip their roads with Peacocks instead of air brakes, but no matter whether they are used as the main brake or the reserve the same excellent results will be obtained.

The list of Peacock users is growing steadily all because of the results obtained from their use.

We know what they will do, so why not let us show you?

National Brake Co.
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Bankers and Engineers

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STONE & WEBSTER

Industrial Plants and Buildings, Steam Power Stations, Water
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ELECTRIC RAILWAY ENGINEER
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THE J. G. WHITE COMPANIES

ENGINEERS
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43 EXCHANGE PLACE . . NEW YORK

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Engineers

Power Plants, Electric Power Transmission
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Huntington Bank Building, Columbus, Ohio

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CLEVELAND, OHIO
Illuminating Bldg.YOUNGSTOWN, OHIO
Mahoning Bank Bldg.The Most Successful Men in the Electric Railway In-
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Steam and Electric Railway "Checking"

Complicated Interurban and Ohmer Fare Register work a specialty. Confidential Investigations. Write for our proposition. Prosecuting Dishonest Conductors. We maintain a special department thoroughly equipped for handling all strikes.

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Investigations, Reports, Appraisals, Expert Testimony, Bridge and Structural Work, Railway Problems, Electrification, Grade Crossing Elimination, Foundations, Highways, Docks, Water Supply, River and Flood Protection, Drainage and Sanitation, Power Plants, Naval Architecture.

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The result of the best
practice in electric rail-
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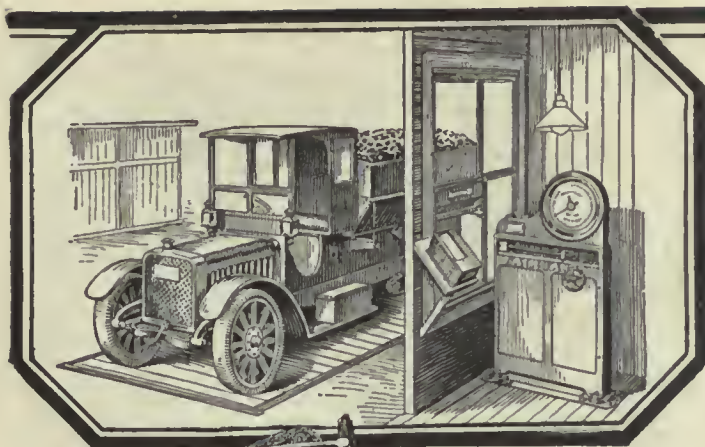


P&H CEDAR POLES

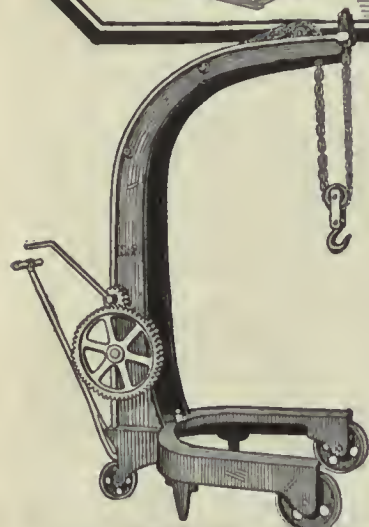
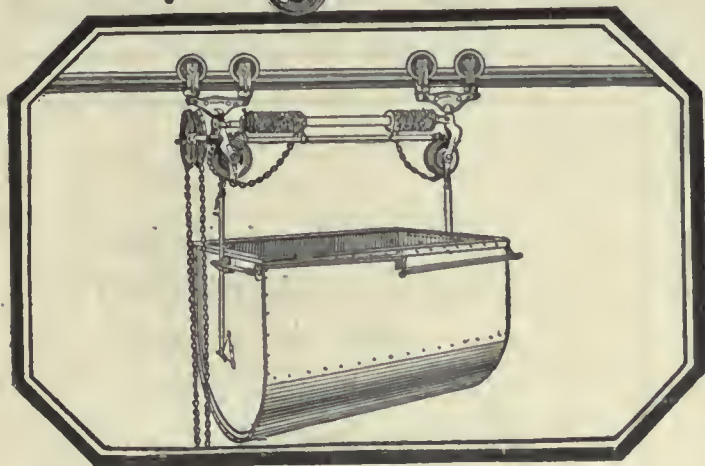
Where Service Counts
PAGE & HILL COMPANY
Minneapolis Chicago New York Kansas City Houston

Scofield Engineering Co. Consulting Engineers
POWER STATIONS PHILADELPHIA, PA.
HYDRAULIC DEVELOPMENTS GAS WORKS
ELECTRIC RAILWAYS

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.



Auto Truck Scale

One man does the work of
four if he uses a Canton
CraneThe Louden Conveyors save floor space and
are easy to push

ACCURATE

The Basis of

EVERY charge for coal, supplies or freight involves a weighing operation. Accurate figures—not guesswork—are essential to the confidence you want to build in your patrons' minds.

Accurate weights—the sort that prevent claims and losses—are a certainty when you use Fairbanks Scales. On a giant 800-ton track scale or a little counter scale, you read the weight exactly, because every weighing device, large or small, bears “The Fairbanks Company O. K.” For everything you want to weigh—whether on freight cars, automobile trucks, overhead trolleys, hand trucks, in bulk, or by hand—there is a Fairbanks Scale. Dial scales give the weight direct in figures up to full capacity—many times the range of the dial alone.

In Fairbanks Branch Warehouses there are repair shops where Fairbanks Scales, after years of service, are restored to their original accuracy. Thus after-service

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Many other appliances for freight and materials handling can be bought under the "Fairbanks Company O. K." Trucks, wheelbarrows, Louden Overhead Carriers, Canton Portable Cranes, shovels, crowbars, chain blocks, conveyor systems—these are just a few of the lines carried in stock by each of the 22 Fairbanks Branch Houses. Their reserves remove the need for large stores of your own.

Rapid, free movement is the only remedy for congestion. Speedy handling is the nation's great need. We can help—ask us how!

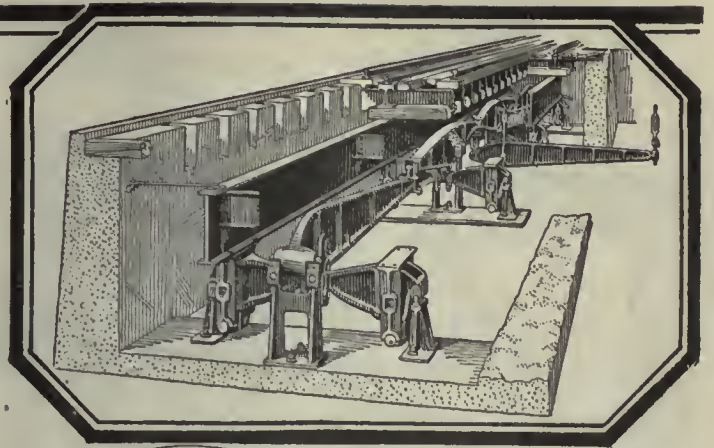
THE FAIRBANKS COMPANY

Administrative Offices: NEW YORK

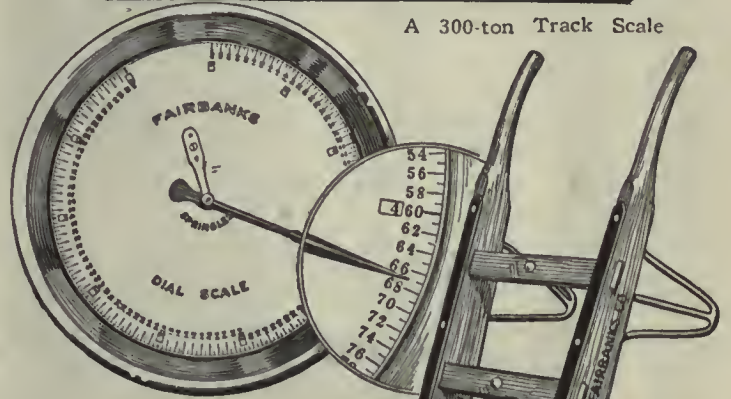
BRANCH OFFICES:

Albany	Chicago	New Orleans	Providence
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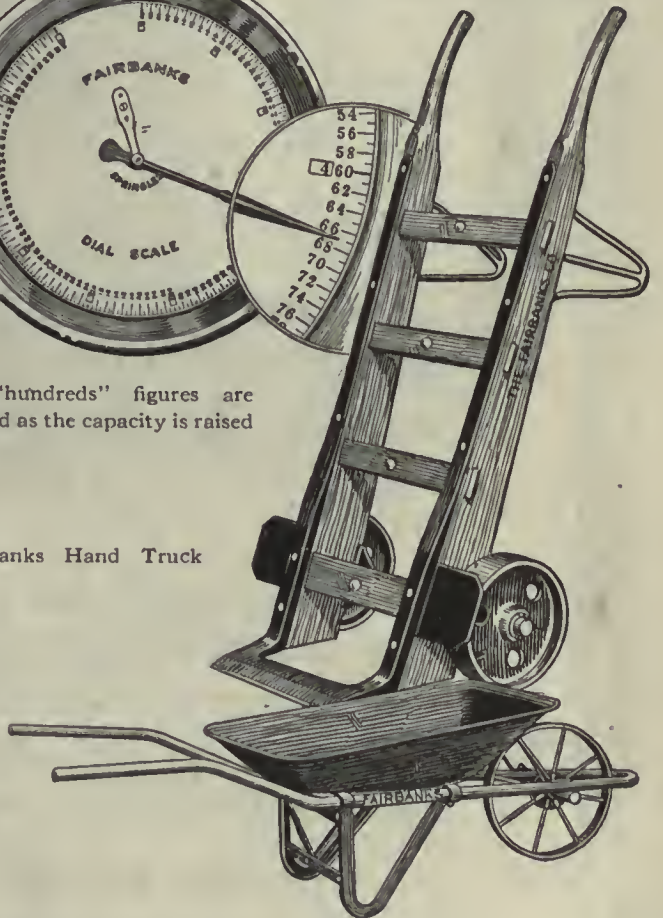


A 300-ton Track Scale



The "hundreds" figures are changed as the capacity is raised

Fairbanks Hand Truck



Steel Wheelbarrow—tubular handles



FACTORY FOR JOHN B. SEMPLE & COMPANY, STOOPS FERRY, PA.

GETTING *THE* CONTRACTOR IS MORE IMPORTANT THAN GETTING *A* CONTRACT!

Your plant extension must comprehend something more than the mere letting of a contract if it is to add to the efficiency of your operations as well as to their scope.

If you will let us confer with you on the matter, it is almost certain that we can evolve from an analysis of *your problems* and *our experience*, suggestions which you will find it beneficial to adopt.

All that we ask is a conference.

The contract will take care of itself.

Our Advice is as Good as Our Service

THOMPSON-STARRETT COMPANY

INDUSTRIAL CONSTRUCTION

NEW YORK

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THE STANDARD FORGINGS COMPANY

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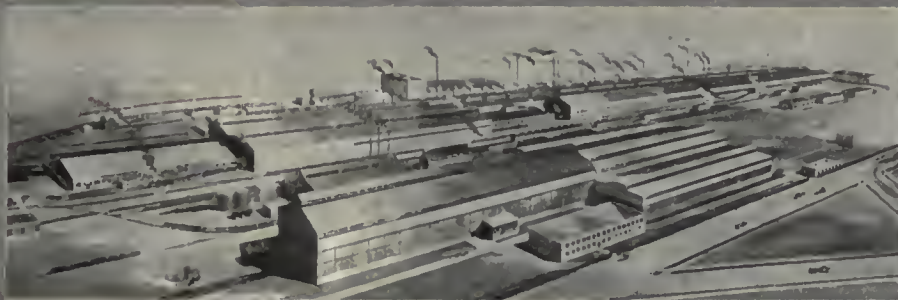
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"STANDARD"

Steel Tires

Steel Tired Wheels

Solid Rolled Steel Wheels

**O. H. Steel and Malleable
Iron Castings**

Solid Forged Gear Blanks

"The 'Standard' Brand on your material"

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s an assurance of eventual economy.”



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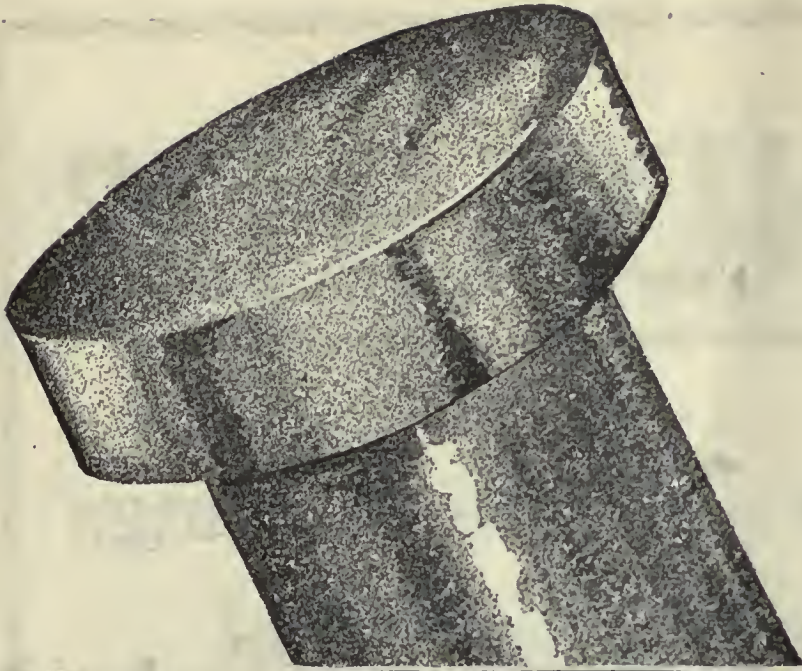
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Monterey, Mex.

Mexico City

London, England

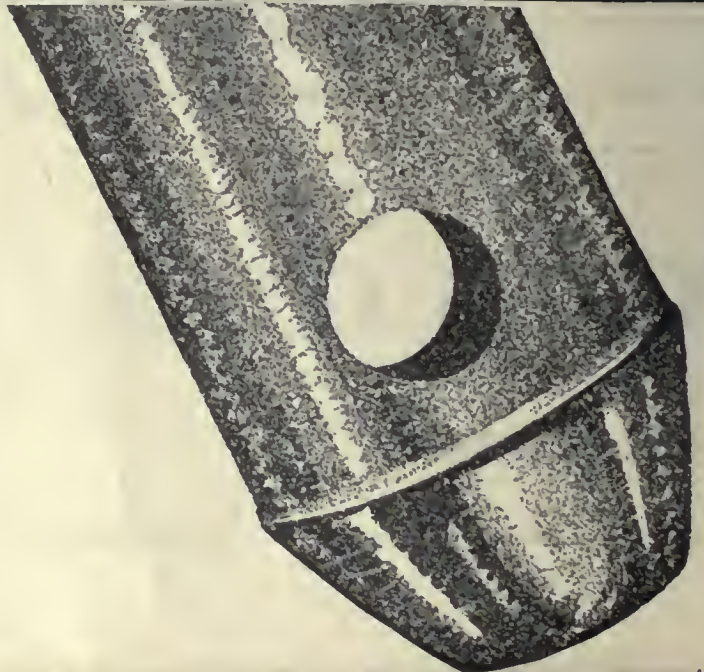
Paris, France



Safety Cars are Safer when **BOYERIZED** Brake Pins are Used

When your brakes are held together by a brake pin that will not break and shows practically no wear after 200,000 miles use, your Safety cars become Safer.

This is what the Boyerized Case Hardened Brake Pin will do. Let us send you samples so you can see for yourself.



ELECTRIC RAILWAY SUPPLIES

Bemis Car Truck Company

SPRINGFIELD, MASS.

Decide To Name It "Increased"

In these days everybody is well acquainted with the adjective used to modify production, fares and prices. It is the word, increased. Why not become still better acquainted with it and use it when you speak of Revenue, by getting Light Weight One Man Cars, built in the Quality Shops. We built the first one years ago. This is the age of Progress, so they're mighty good cars now.

St Louis Car Company

St Louis Mo.



An Up-to-date Railway

Above is a reproduction of the General Electric Co. advertisement which appeared in colors on the back cover of *Electric Railway Journal*, September 27th issue.

It shows fifteen modern cars recently placed into operation at Oshkosh, Wisconsin, by the Eastern Wisconsin Electric Co.

The Eastern Wisconsin Electric Co. realizes that the best is the cheapest in the end. That's why they bought



to properly take care of their drainage problems. They wanted culverts like these few cars—safe and durable.

"ACMES" are safe because the deep corrugations and heavy gauge "No-Co-Ro" Metal make them really stronger than necessary. They will hold up under the heaviest traffic.

"ACMES" are durable because they are made from "No-Co-Ro"—that famous pure iron. They resist rust.

Write for Folder M-21.



Elevated Station, B. R. T. Co.
Brooklyn, N. Y.

Also for roofs

JOHNS-MANVILLE Transite Asbestos Wood is an absolutely fireproof building material that is valuable not only for paneling, doors and partitions, but also for roofs.

Public Utilities have found it particularly desirable for roofing passageways, where to obvious weatherproof qualities must be added absolute immunity to fire and decay.

The nearest Johns-Manville branch can give you detailed information about the adaptability of Transite Asbestos Wood to your requirements.

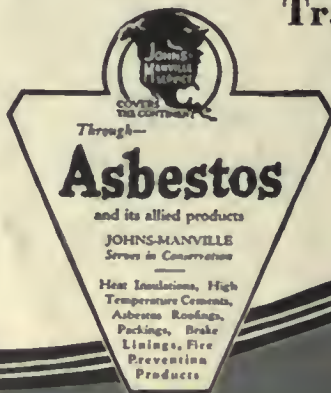
H. W. JOHNS-MANVILLE CO.

New York City

10 Factories—Branches in 63 Large Cities

For Canada: Canadian Johns-Manville Co., Ltd., Toronto

JOHNS-MANVILLE Transite Asbestos Wood





Ideal for Your Lines

ANDERSON Sheet Steel Insulated Crossing Round Top Straight Line Suspension

Your overhead is completely insured by Anderson Line material.

The Sheet Steel Insulated Crossing is stronger yet 25% lighter than other crossings. It is made of the best homogeneous sheet steel and fitted with renewable insulated runways to insure long life under heavy service.

Anderson Round Top Straight Line Suspension has drop forged steel studs made with outriggers turned up or down.

Both of these Anderson specialties are money savers.

Albert & J. M. Anderson Mfg. Co.

(Established 1877)

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Chicago, 105 So. Dearborn St.
Philadelphia, 429 Real Estate Trust Bldg.
London, E. C., 48 Milton St.



Rome

COPPER AND BRONZE BARE WIRE

Round, square and rectangular,
plain and tinned.

HOT ROLLED COPPER AND BRONZE RODS

COPPER AND BRONZE TROLLEY WIRES

Round, grooved and figure eight

POWER CABLES

Solid and stranded.

ROUND EDGE FLAT COPPER WIRE

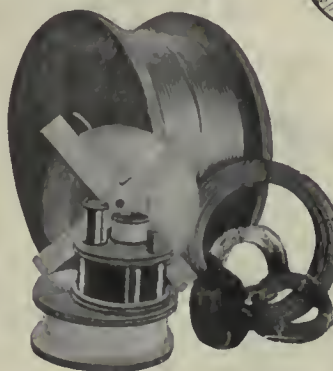
MAGNET WIRE

Round, square and rectangular,
cotton covered, silk covered,
enamel covered, enamel and
cotton, enamel and silk.

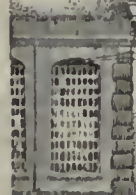
POLISHED COPPER PIANO COVERING WIRE



Rome-Wire
The Symbol of
Efficiency in Electrical Conductors



Wires and Cables
suited to
every
use



All Operations from Wire Bar to Finished Product in this Plant

Wire

WIRES AND CABLES FOR EXPORT

GATHERING LOCOMOTIVE CABLE

MINING MACHINE CABLE

DECK CABLE

BREWERY CORD

SPECIAL WIRES AND CABLES

GAS ENGINE CABLE

RUBBER INSULATED WIRE

Bridle wires, flexible cords,
jumper wires, telephone wires,
N. E. C. S. wire, fixture wires,
heater cords.

AUTOMOBILE WIRES

Charging cables, ignition wires,
starter cable, lighting wire,
horn wire.

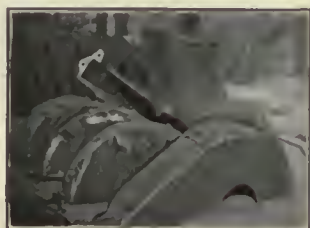
The ERICO General Utility Welding Apparatus

Serviceable All The Year Round

Bonding



TYPE ET RAIL BOND



Reclaiming

Repairing



Renewing

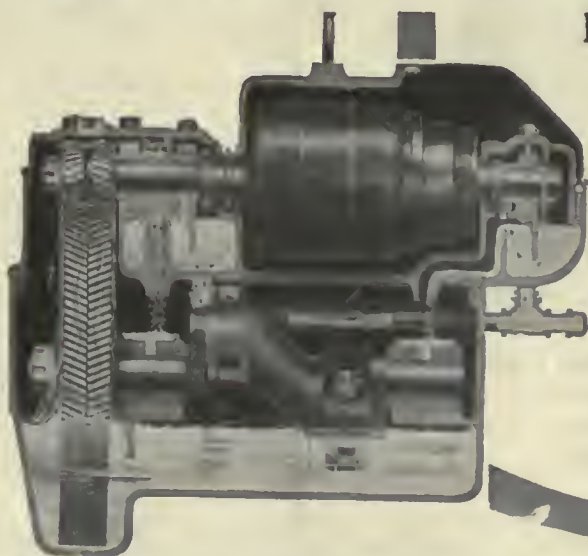


Always Busy

The Electric Railway Improvement Co., Cleveland, O.

Compressors for Air Brake Equipment—

Lubrication—



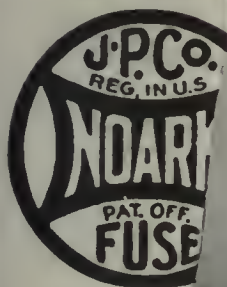
The thoroughness with which this important detail has been worked out is an index to the complete design and careful construction of these improved compressors for air brake equipments.

*Let us tell you more about them.
Send for Bulletin 1525-A.*

ALLIS-CHALMERS

Milwaukee, Wis. U.S.A.

Manufactured by the
Johns-Manville Co.,
Hartford, Conn.
H. W. Johns-Manville Co., sole selling agents.



NOARK RENEWABLE FUSES

*The lug and the slot keep the
knife blades rigid.*

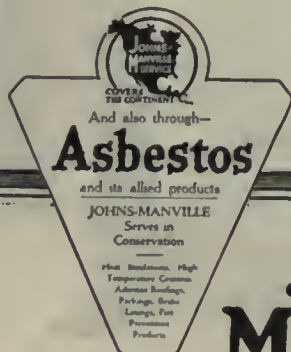
The "Noark" Renewable Fuse has knife blades that can't wobble—a particularly desirable feature when the fuse is used as a knife switch and always valuable as insurance against faulty clip contact.

A lug on the blade which fits into a slot on the cartridge assures this steadiness.

This is but one of the many unique features of the "Noark" Renewable Fuse—learn about the others. A trial will prove our contention that "Noark" is the best renewable fuse that you can buy.

H. W. JOHNS-MANVILLE CO.
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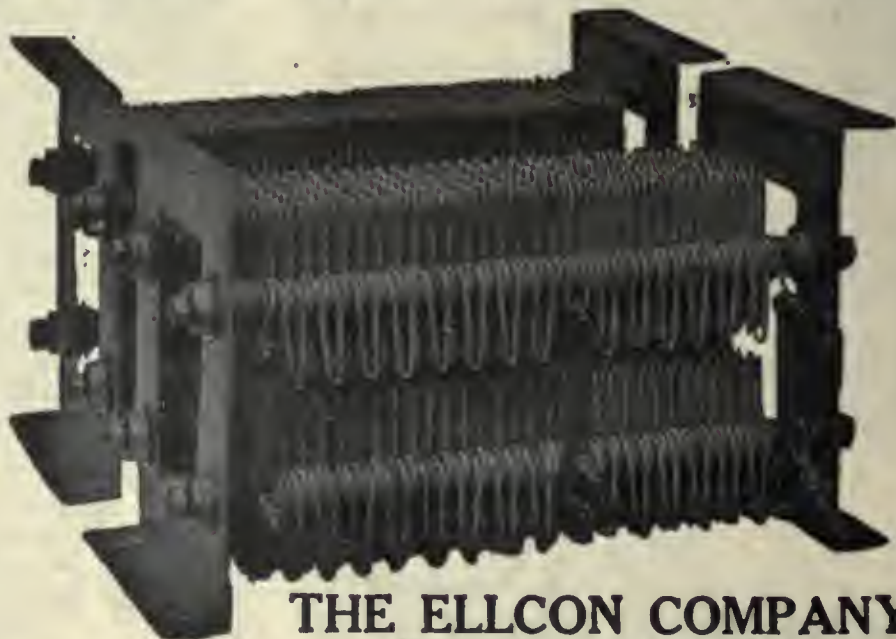
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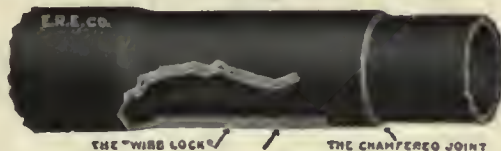
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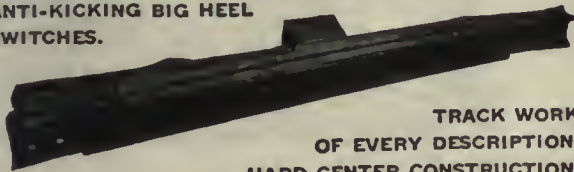


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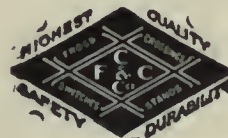
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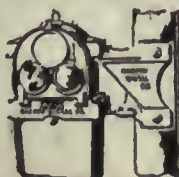
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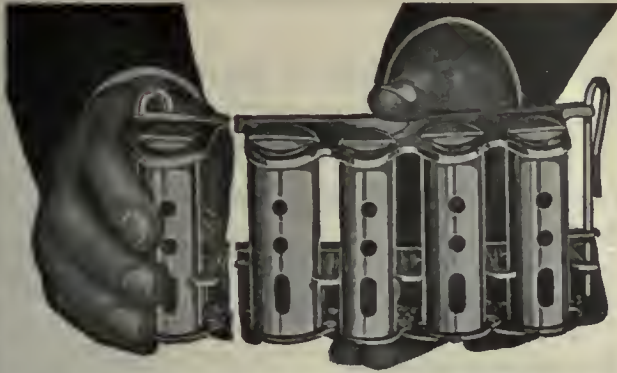


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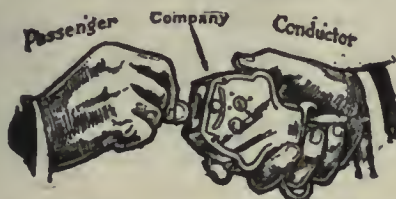


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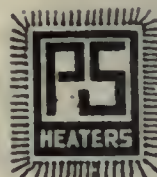
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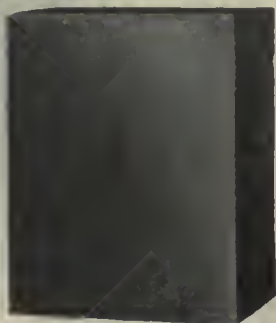
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PEREY TURNSTILES or PASSIMETERS



*Faster than the
Ticket Seller*

Perey Manufacturing Co., Inc.
30 Church Street, New York City



*We specialize in the
manufacture of*
HIGH GRADE
BRUSHES for
RAILWAY MOTORS

and all other types of electrical
equipment. All brushes especially
designed for the service in which
they are to operate and satisfactory
performance guaranteed.

Send for specification blanks

THE UNITED STATES GRAPHITE COMPANY
Saginaw, Michigan, U. S. A.

Branch Offices: New York, Pittsburgh, Philadelphia, Birmingham,
Chicago, St. Louis, Denver, San Francisco

The "Nycap-Exide" Battery

for
STORAGE BATTERY
STREET CARS

THE ELECTRIC STORAGE BATTERY CO
PHILADELPHIA

The Kalamazoo Trolley Wheels

have always been made of entirely new metal, which accounts for their long life **WITHOUT INJURY TO THE WIRE.** Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the **LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.**



THE STAR BRASS WORKS
Kalamazoo, Mich., U. S. A.

Now the **ONE-MAN SAFETY CAR** has arrived, start right with

Standard Patterns Reinforced Brake Shoes

Pattern No. D-67, $2\frac{1}{4}$ inches to $2\frac{1}{2}$ inches; wheel treads for narrow heads.

Pattern No. D-87, $2\frac{3}{4}$ inches to 3 inches; wheel treads for wide heads and use Solid End Plate Brake Heads for Efficiency and Economy.

**The American Brake Shoe
and Foundry Company**

30 Church Street, New York

332 S. Michigan Ave., Chicago

Chattanooga, Tenn.

McGuire-Cummings Manufacturing Company

City and Interurban Cars and
Trucks, Snow Sweepers and Plows,
Express, Combination and Work
Cars, Electric Locomotives

General Offices—111 West Monroe St.
CHICAGO

WITH absolute sincerity we make the statement that **AJAX BULL BABBITT** is

Physically and Chemically the
Scientifically Correct Babbitt.
"Most dependable—Most economical."

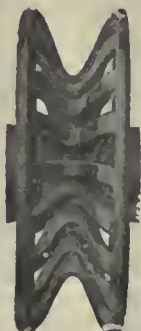
THE AJAX METAL COMPANY Established 1880
Main Office and Works: Philadelphia, Pa.
Southern Plant: Birmingham, Ala.



IRVING SAFSTEP TRADE MARK
(PATENTED) REG. U. S. PAT. OFF.
ABSOLUTELY NON-SLIPPING ALWAYS

Write for Catalog 2A28

Irving Iron Works Co.
Long Island City, N. Y., U. S. A.



ICE IS A POOR CONDUCTOR OF POWER— KEEP IT OFF YOUR WIRES

What if the weather is freezing and your trolley wires are coated with ice. Service will continue if there are Nuttall Sleet Wheels or Sleet Scrapers ready to keep your wires clean.

Better order today.

R. D. NUTTALL CO., Pittsburgh, Pa.

Nuttall Helical Gears

A PROVEN SUCCESS



Bayonet Detachable Trolley Harps



save time, labor, wheels,
wire, power, money; keep
your cars on schedule
time, prevent accidents.
Satisfaction guaranteed

Bayonet Trolley Harp Co.
Springfield, Ohio, U. S. A.

VAN DORN COUPLERS

are made for every condition and
requirement. M. C. B. Pin and
Link, Car and Air, in all sizes
and types.

VAN DORN COUPLER CO.
2325 So. Paulina St., Chicago, Ill.

**"LE CARBONE"
CARBON BRUSHES**

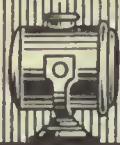


Le Carbone
Carbon Brushes are
uniform. They talk
for themselves.

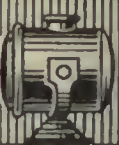
W. J. Jeandron
227 Fulton Street
New York City

Pittsburg Office:
636 Wabash Building

Canadian Distributors:
Lyman Tube & Supply Co., Ltd.
Montreal and Toronto



SEARCHLIGHT SECTION



Ads Set in Uniform Style

(Sold in one paragraph, without display)

THREE CENTS A WORD, minimum charge 50 cents an insertion, payable in advance, less 10 per cent. if one payment is made in advance for four continuous insertions—for advertisements under:

Positions Wanted Vacation Work Wanted
Evening Work Salesman Wants
Wanted Connections

FIVE CENTS A WORD, minimum charge \$1.50 an insertion, for advertisement under:

Agencies Wanted Positions Vacant
Partners Wanted
Business Opportunities Representations Wanted
Desk Room for Rent Salesmen Wanted
Educational Patents for Sale
Employment Agencies Plants for Sale
Desk Room Wanted Sub-Contracts Wanted
Foreign Business Work Wanted

Miscellaneous for Sale, for Rent or Want Ads.

THIRTY CENTS A LINE, minimum five lines, for all undisplayed advertisements set with a paragraph for each item or tabulated.

THREE DOLLARS AND SIXTY CENTS AN INCH for advertisements for bids (Official Proposals).

ADVERTISING RATES FOR ELECTRIC RAILWAY JOURNAL

Ads Set in Display Type

(Individual space, within border rules)

Space for these advertisements is sold by the inch. Each page contains 30 inches. The rate per inch is based on the total number of inches to be used—that is, the number of inches the advertisement is to occupy multiplied by the number of insertions it is to receive. For instance, a 2-inch advertisement in 2 issues earns the 4-inch rate of \$2.90 an inch. A 1-inch space for 4 issues, or a 4-inch space in one issue, also earn the 4-inch rate.

Schedule of Rates

1 to 3 in., \$3.00 an in. 15 to 26 in., \$2.70 an in.
4 to 7 in., 2.90 an in. 27 to 49 in., 2.60 an in.
8 to 14 in., 2.80 an in. 50 to 99 in., 2.55 an in.

Rates for larger space furnished on request.

In Replying to Ads

DO NOT ENCLOSE original testimonials or anything that you may want returned. State your experience and qualification in as concise and neat a manner as possible and enclose copies of your testimonials.

BE CAREFUL TO PUT ON ENVELOPE, when answering any "blind" ad, the box number in the ad, the name of the paper, and also the local address of office to which reply is sent:

36th St., at 10th Ave., New York
935 Real Estate Trust Bldg., Philadelphia
533 Leader-News Bldg., Cleveland
1570 Old Colony Bldg., Chicago
501 Rialto Bldg., San Francisco

When Writing Copy

ALLOW FIVE WORDS for the address, if replies are to a box number in care of any of our offices. There is no extra charge for forwarding replies.

TO SIGN YOUR NAME and address to your advertisement begets the confidence of the reader and facilitates receiving replies. You can, however, obviate delay in receiving answers by signing your ad, only with initials (your own or others), care of your home, your office or a post-office box number in your city.

POSITIONS VACANT

EMPLOYMENT

POSITIONS WANTED

POSITIONS VACANT

ROADMASTER required by an electric railway in New York State operating 100 miles of track, mostly in paved city streets. This is a good job and requires a good man who can organize and run several construction and maintenance gangs. State age, experience and salary expected. P-528, Elec. Ry. Journal.

NIGHT foreman wanted for a combined city, suburban and interurban street railway system in middle west, operating about 110 cars. Must be familiar with both 600 and 1200 volt equipments. Applicant should give age, experience, references and salary expected. P-545, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

POSITIONS WANTED

ELECTRICAL engineer, university graduate, now employed, desires to make a change. Nine years' experience in electric railway power, mechanical and purchasing departments. Can refer to present and past employers and others. PW-544, Elec. Ry. Journal.

WANTED

Street Railway Company having one million dollars receipts, excellent physical and financial condition, desires thoroughly experienced and capable

Vice President and Manager

Must be good executive

P543—Electric Railway Journal,
10th Ave. at 36th St., New York City

POSITIONS WANTED

AUDITOR-COMPTROLLER desires position with larger properties; 15 years' experience; salary, \$3600; references, present employers. PW-531, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

YOUNG man, 32; seven years' electric railway traffic experience open for engagement after December 15, either electric railway or industrial concern; familiar both freight and passenger tariffs and schedules, and compilation thereof; freight claims, soliciting of business, general correspondence. Now engaged as traveling claim investigator, large system; best of references. PW-536, Elec. Ry. Journal.

WANTED

Shop Superintendent

Thoroughly familiar with the latest methods of manufacturing railway bearings. Reply by mail only to Room 208, 103 Park Avenue, New York City, stating qualifications. All replies considered strictly confidential.

ELECTRICAL ENGINEER

The services of an Electric Railway Engineer, 45 years of age and thoroughly familiar with railway operation, are available, on short notice, to a consulting firm or railway property requiring a man of ability and willing to pay a commensurate salary.

PW-523—Electric Railway Journal
935 Real Estate Trust Bldg., Philadelphia, Pa.

EXECUTIVE POSITION

by a practical and technical man, fifteen years' lighting, power and street railway experience. Excellent references and at present employed.

PW542—Railway Journal
Tenth Ave. at 36th Street, New York City

POSITIONS WANTED

ACCOUNTING executive, expert auditor, available immediately. PW-530, Elec. Ry. Journal.

FOR SALE

Blueprints

Electrical connections, 236 A.C. motor, single, two and three phase. Voltage, cycle, phase changing. 123 D.C. voltage changing, etc. 120 transformer connections. 150 rheostats, controllers, compensators, internal and external. 10 samples A.C. 25c. Particulars free. Charles Chittenden, Dept. J, 3024 Matthews Ave., Kansas City, Mo.

The Searchlight Advertising in This Paper

a read by men whose success depends upon thorough knowledge of means to an end—whether it be the securing of a good second-hand piece of apparatus at a moderate price, or an expert employee.

The Best Proof

if this is the variety of this journal's Searchlight ads. Without a constant and appreciable demand for such machinery or services, by its readers, the market-place which these advertisements represent could not exist for any length of time.

Are you using the Searchlight Section?

WANTED

300 tons of 70-pound A S C E
Relaying Rails

with necessary angle bars or continuous joints to lay same. Three miles of 2 or 3 naught round hard drawn copper trolley wire. All the above material must be in first class condition and ready for delivery not later than April 1st.

W524—Electric Railway Journal
1570 Old Colony Bldg., Chicago, Ill.

WANTED

**16 General Electric
No. 58 Motors**

with 4 turn armatures

TRANSIT EQUIPMENT CO.
501-5th Avenue, New York City

WANTED—5,000 Second Hand

TIE-PLATES

for 70-lb. ASCE Tee Rail.

Rochester & Syracuse Railroad Co., Inc.
J. H. HICKEY, Purchasing Agent
500 Syracuse Savings Bank Bldg., Syracuse, N. Y.

FOR SALE

70 K.W., 250 volts, D.C., General
Electric

Generator

direct connected to 100 H.P., 720 R.P.
M., polyphase

General Electric Motor

complete with switchboard and starting compensator. Price \$2500 f. o. b. cars New York City.

SPILGER ELECTRIC CO.

109 Barclay Street, New York City

**Second Hand or Used
Trucks Wanted**

Wanted, two Brill 21-E Trucks with 33-in. wheels, 4-in. axles, either 7-ft. 6-in. or 8-ft. wheelbase; wheels must have at least 2¼-in. face or else sold without wheels. State price.

Selma Electric Railway Co.
Selma, Ala.

WANTED

FLAT CAR

equipped with M C B Radial Draw Bar and Air.

W541 Electric Railway Journal
1570 Old Colony Bldg., Chicago, Ill.

BOILERS

2 Approximately 85 H.P. Shell boilers in very good condition, 66 in. diam., 16 ft. long, containing 78 ¾ tubes, 16 ft. long, each equipped with necessary parts to make complete unit.

4—Sterling 250-H.P. Boilers, Class F No. 5, 192—¾-in. tubes, 42-in. steam and mud drums. Pressure 160 lb., 8-in. steam opening.

STEEL BRIDGE

Also 1 single track steel bridge through span 129 ft. 9 in. Trusses, nine-panel, pin connected, Pratt type, 21 ft. high, 15 ft. 10 in. centers. Loading 60-ton electric cars in train. Can be easily modified for highway use.

For information
and prices address

G. W. WAGNER
Detroit United Railway Company
DETROIT, MICH.

ROTARY

1—300 Kw. Rotary Converter, 600-v. D.C.
3-phase, 60-cycle A.C. with 3—125 Kw.
2300-v. Primary Transformers.

WILSON

1102 Federal Reserve Bank Bldg.,
St. Louis, Mo.

WHICH GETS THE BEST PRICE ?



ONE BID OR MANY

One bidder
usually
buys
at a sale price.

A number of bidders
enables the seller
to get
full market value.

When you have Second Hand Equipment to sell you want *all* the bidders possible.

Advertising secures more bidders.

An advertisement in *one* issue may make a sale possible but—to sell at the *best* price you must have a choice among a *number* of buyers.

A *number* of insertions will get them for you.

BE SURE—advertise your equipment until it is sold. Advertise it in the **SEARCHLIGHT SECTION** to get the **most** bidders.

**TURBINE**

1—500-kw. Westg. Horizontal, 3-ph., 60-cy., 370-v. (can be rewound for any standard voltage), 3600 r.p.m., with or without condensing equipment.

FREQUENCY CHANGER

1—600-kw. Allis-Chal. 300 r.p.m., 3-ph., 60-cy., 2300-v. and 3-ph., 25-cy., 6600-v., complete with direct connected exciter, panelboards and rheostats.

ROTARY CONVERTERS

1—500-kw. Westinghouse Rotary Converter, 6-ph., 600-v. D.C., 430-v. A.C., 600 r.p.m.
1—300-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C., 600 r.p.m.
1—150-kw. Westinghouse Rotary Converter, 2 or 3-ph., 60-cy., 250-v. D.C., 720 r.p.m.

ARCHER & BALDWIN, INC.

114-118 Liberty St., New York, N. Y.
Telephones 4337-4338 Rector




SEARCHLIGHT SERVICE
SECURES SATISFACTORY SITUATIONS SALES

NEW RAILS

500 tons 100-lb.	150 tons 75-lb.
200 tons 90-lb.	450 tons 70-lb.
650 tons 80-lb.	800 tons 60-lb.

SWITCH TURNOUTS

3—70-lb. A.S.C.E., and frog Manganese, New.
1—60-lb. ARA-A 4 1/2 L. H. Good as new.
800 kegs 1/2 x 5 1/2 in. New Spikes.
400—70-lb. Rail Brakes, New.

Track Accessories, All Kinds
Prompt Shipment.

ZELNICKER IN ST. LOUIS

Get Bulletin No. 270—60 pages of unusual values. It's a Big Money Saver.

FOR SALE

2—Walker Generators, 550 volt.
2—General Electric Generators, 550 volt, total approximating 5000 kilowatts.

All direct connected to Allis-Chalmers engines.

6—B. & W. 250-hp. boilers and
6—Altman Taylor 500-hp. boilers.

Also Switchboard and other necessary equipment.
The above machinery in operation at present time.

KANSAS CITY RAILWAYS CO.
Purchasing Dept., Kansas City, Mo.

Plant Equipment For Sale

1—300-hp. Russell Four-Valve Automatic Engine.

1—200-kw. Stanley, 2300-volt, 2 or 3-phase, A. C. Generator with complete Switchboard. Necessary fittings.

All above in good condition. For Price write,

COUCH BROS. MANUFACTURING COMPANY, Atlanta, Ga.

HYMAN MICHAELS COMPANY

Peoples Gas Building, CHICAGO, ILL.

**NEW and RELAYING RAILS
IRON and STEEL SCRAP**

Plants at East Chicago, Indiana
St. Louis Plants, Adelaide and Bulwer Ave., and Broadway and Humboldt St.
St. Louis Office, Railway Exchange Building
Pittsburgh Office, First National Bank Building

25-cy. 3-ph. Eng. Sets.
1—1000-kva. 370-v. G. E.
2—750 kva., 370 v.
1—3000 kva. Plant.

Complete with boilers, stokers, etc.
April, 1920, delivery.

2—500-kw. Ry. Rotaries.
2—500-kw., 60-cy. Ry. M.D. Sets.
30—Boilers, 100-525 hp.
1—300-kw. portable Ry. substation.
5—300 Railway rotaries and Auxils.

ROSS POWER EQUIP. CO.
Indianapolis, Ind.

3—Brill Semi-Convertible Cars

28- ft. over corner posts.

Brill 27-F trucks.

4—G. E. 67 motors, 2-K-6 Controllers.

Splendid condition. Full details upon request.

Electric Equipment Company
Commonwealth Building,
Philadelphia, Pa.

RAILS

15,000 TONS—NEW and RELAYERS
NEW—12 lb., 16 lb., 20 lb., 25 lb., 30 lb.,
40 lb., 60 lb., 70 lb., 75 lb., 80 lb.,
85 lb., 90 lb.

RELAYERS—30 lb., 35 lb., 40 lb., 45 lb.,
50 lb., 60 lb., 70 lb., 80 lb., 85 lb.,
90 lb., 100 lb.

Fastenings, New Bolts, Nuts and Spikes,
New Frogs, Switches, Crossings and all
accessories. Carload and less carload in-
quiries and orders a specialty. Rails cut
to lengths for structural purposes. At-
tractive prices. Immediate shipments from
stock.

L. B. FOSTER COMPANY
General Office:
Park Building, Pittsburgh, Pa.

Tribune Bldg., 154 Nassau St., New York
N. Y.

CARS FOR SALE

2—McKean Gaso-Electric Cars.
12—Differential 20-yd. Cars.
5—Gasoline Passenger Cars.
50—Freight Cars.
12—Electric Sets.

Get our List and Prices.

J. F. DONAHOO CO., Birmingham, Ala.

WORRYLESS ELECTRICAL REPAIRS

On all kinds and sizes A.C. or D.C. motors and generators, starters, welders, controllers, or anything electrical. Quick shipment from stock material, of coils commutators—shafts—bearings, etc. Remember our initials stand for our product.

CAREFUL ACCURATE WORRYLESS
CLEVELAND ARMATURE WORKS, Inc.

EST. 1895

4732-4-8 ST. CLAIR AVE., CLEVELAND

INC. 1918

For Every Business Want: "Think SEARCHLIGHT First"



Wherever the mail goes “SEARCHLIGHT” Advertising goes

Even the swift Post-Planes carry the message of “Searchlight” advertising. And swift are the results for advertisers who use the “Searchlight” to tell readers of McGraw-Hill papers their needs or business propositions.

Quickly following the printing of a Searchlight advertisement, machinery or equipment has been rented or sold, positions found or filled, money-saving bids received from Official Proposal advertising and other worth-while results secured.

Over 160,000 men in 10 big engineering fields look to the “Searchlight” for the advertising of current “Opportunities” in their industries. That’s why it pays to “Think SEARCHLIGHT First!”



Photos copyright by Underwood & Underwood, N. Y.

For Highest Results Advertise and Find Your “Opportunities” in the

SEARCHLIGHT SECTION

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with
Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Heaters
Holden & White, Inc.

Ammeters
Weston Elec'l Instrument Co.

Anchors, Guy
Chance Co., The
Electric Service Supplies Co.
Holden & White, Inc.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Ash Storage Tanks, Cast Iron
Green Engineering Company

Automobiles and Buses
Brill Co., The J. G.

Axle Straighteners
Columbia M. W. & M. I. Co.

Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Cambria Steel Co.
Carnegie Steel Co.
Midvale Steel & Ordnance Co.
National Railway Appliance Co.
St. Louis Car Co.
Standard Steel Works Co.
Westinghouse Elec. & M. Co.

Babbitt Metal
Ajax Metal Co.
More-Jones Brass & Metal Co.

Babbitting Devices
Columbia M. W. & M. I. Co.

Badges and Buttons
Electric Service Supplies Co.
International Register Co., The

Batteries, Dry
Johns-Manville Co., H. W.

Batteries, Storage
Electric Storage Battery Co.
Johns-Manville Co., H. W.

Bearings and Bearing Metals
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

Bearings, Center and Roller Slide
Holden & White, Inc.

Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

Benders, Rail
Niles-Bement-Pond Co.
Zelnicker, Walter A., Supply Co., Inc.

Bollers
Babcock & Wilcox Co.

Roller Coverings
Johns-Manville Co., H. W.

Roller Tubes
National Tube Co.

Road Testers
American Steel & Wire Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
Ohio Brass Co.

Roads, Rail
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Rolling Tools, Car Wheel
Niles-Bement-Pond Co.

**Brackets and Cross Arms. (See also
Poles, Ties, Posts, Etc.)**
American Bridge Co.

Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Hubbard & Co.
Linsley Bros. Co.
Ohio Brass Co.

Brake Adjusters
Holden & White, Inc.
Westinghouse Traction Brake Co.

Brake Shoes
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Brakes, Brake Systems and Brake

Pads
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Holden & White, Inc.
National Brake Co.
St. Louis Car Co.
Safety Car Devices Co.
Westinghouse Traction Brake Co.

Bricks, Fire
Green Engineering Co.

Bridges and Buildings
American Bridge Co.
Thompson-Starrett Co.

Brooms, Track, Steel or Rattan
Paxson Co., J. W.
Zelnicker, Walter A., Supply Co., Inc.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
United States Graphite Co.
Westinghouse Elec. & M. Co.

Brushes, Graphite
United States Graphite Co.

Brush Holders
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.

Buckets
Blaw-Knox Company

Bunkers, Coal
American Bridge Co.

Bushings
Ives Co., The H. B.

**Bushings, Case Hardened &
Manganese**
Bemis Car Truck Co.

Bushings, Graphite & Wooden
Bound Brook Oilless Bearing Co.

Cables. (See Wires and Cables)

**Carbon Brushes. (See Brushes,
Carbon)**

**Car Equipment. (For Fenders,
Hraters, Registers, Wheels, etc.
See those headings)**

**Car Trimmings. (For Curtains,
Registers, Doors, Seats, etc.
See those headings)**

Car Panel Safety Switches
Westinghouse Elec. & Mfg. Co.

**Cars, Passenger, Freight, Express,
etc.**
American Car Co.
Brill Co., The J. G.
Cambria Steel Co.
Kohman Car Co., G. C.
Midvale Steel & Ordnance Co.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.
Thomas, Perley A.
Watson Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Car, Self-Propelled
Electric Storage Battery Co.
General Electric Co.

**Castings, Brass, Composition or
Copper**
Ajax Metal Co.

Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
American Bridge Co.
American Steel Foundries
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
Standard Steel Works Co.

Castings, Malleable and Brass
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Catchers and Retrievers. Trolley
Electric Service Supplies Co.
Holden & White, Inc.
Ohio Brass Co.
Wood Co., Chas. N.

Change Carriers
McGill Ticket Punch Co.

Circuit Breakers
Cutter Electrical & Mfg. Co., The
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Clamps and Connectors for Wires
and Cables**
Anderson Mfg. Co., A. & J. M.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Eureka Co.

General Electric Co.
Hubbard & Co.
Klein & Sons, Matthias
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Cleaners and Scrapers Track—(See
also Snow-Plows, Sweepers and
Brooms)**
Brill Co., The J. G.
Ohio Brass Co.

Clusters and Sockets
General Electric Co.

**Coal and Ash Handling—(See Con-
veying and Hoisting Machinery)**

Coil Banding and Winding Machines
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Coils, Armature and Field
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
D. & W. Fuse Co.
General Electric Co.
Independent Lamp & Wire Co.
Romo Wire Co.
Westinghouse Elec. & M. Co.

Coils, Choke and Kieking
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coin-Counting Machines
Electric Service Supplies Co.
International Register Co., The
Johnson Fare Box Co.

Commutator Slotters
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Commutator Trailing Devices
General Electric Co.

Commutators or Parts
Cameron Electrical Mfg. Co.
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Compressors, Air
Allis-Chalmers Mfg. Co.
Chicago Pneumatic Tool Co.
General Electric Co.
Westinghouse Trac. B. Co.

Concrete Mixers
Blaw-Knox Co.

Condensers
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Connectors, Solderless
Westinghouse Elec. & Mfg. Co.

Contracting Engineers
Thompson Starrett Co.

Controller Fingers
Eureka Co.
Triggerlock Reversible Controller
Finger

Controllers or Parts
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Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Converters, Rotary
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Portable Machinery Co.

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Columbia M. W. & M. I. Co.
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Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Roebblings Sons Co., John A.
Samson Cordage Works

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Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

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Brill Co., The J. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Trac. B. Co.

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Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.
Toledo Bridge & Crane Co., The

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International Steel Tie Co.

**Crossing Signals. (See Signals,
Crossing)**

**Crossings, Track. (See Track,
Special Work)**

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Allis-Chalmers Mfg. Co.

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Armco Iron Culvert & Flume
Mfrs. Assn.
Canton Culvert & Silo Co.

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Brill Co., The J. G.
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Archer & Baldwin
Cleveland Armature Wks.
Electric Equipment Co.
Foster Co., L. B.
Griawold Machine Co., Geo. M.
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MacGovern & Co., Inc.
Zelnicker Supply Co., Inc.,
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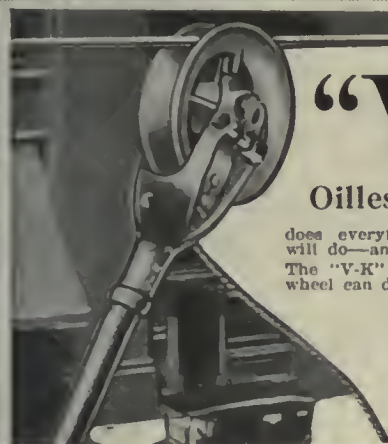
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Feustel, Robert M.
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American Mason Safety Thread Co.

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Irving Iron Wks.

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Columbia Machine Wks. & M. I. Co.
Eureka Co.
Standard Forgings Co.
Standard Steel Works Co.
Williams & Co., J. H.

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D. & W. Fuse Co.
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Johns-Manville Co.
Westinghouse Elec. & Mfg. Co.
Williams & Co., J. W.

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Columbia M. W. & M. I. Co.
General Electric Co.

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Johns-Manville Co., H. W.
Westinghouse Traction Brake Co.

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Westinghouse Elec. & Mfg. Co.

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Westinghouse Elec. & Mfg. Co.

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General Electric Co.

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American Bridge Co.

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Hensley Trolley & Mfg. Co.
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Star Brass Works

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General Electric Co.
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St. Louis Car Co.

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Cooper Heater Co.
Holden & White, Inc.
Smith Heater Co., Peter

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Holden & White, Inc.
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Lackawanna Steel Co.
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General Electric Co.
Westinghouse Elec. & Mfg. Co.

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General Electric Co.
Westinghouse Elec. & Mfg. Co.

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Lathes, Car Wheel
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General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

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Chance Co., The
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Electric Service Supplies Co.
Eureka Co.
General Electric Co.
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Brill Co., The J. G.

Sash Metal, Car Window
Hale & Kilburn Corp.

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Fairbanks Co., The

Scrapers, Track. (See Cleaners and Scrapers, Track)

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Brill Co., The J. G.
Hale & Kilburn Corp.
St. Louis Car Co.

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Brill Co., The J. G.

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National Pneumatic Co., Inc.

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Nachod Signal Co., Inc.
U. S. Electric Signal Co.
Wood Co., Chas. N.

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Nachod Signal Co., Inc.
U. S. Electric Signal Co.

Slack Adjusters. (See Brake Adjusters)

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Electric Railway Equipment Co.
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Nuttall Co., R. D.

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McGuire-Cummings Mfg. Co.

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American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.

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Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

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Blaw-Knox Co.

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American Mason Safety Tread Co.
Irving Iron Works
Universal Safety Tread Co.

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Irving Iron Wks.

Steps, Safety
Irving Iron Wks.

Stakes, Mechanical
Babcock & Wilcox Co.
Green Engrg. Co.
Westinghouse Elec. & Mfg. Co.

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Strand
Roebbling's Sons Co., J. A.

Straps, Car, Sanitary
Holden & White, Inc.

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Subway Grating
Irving Iron Wks.

Superheaters
Babcock & Wilcox Co.
Locomotive Superheater Co.
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Anderson Mfg. Co., A. & J. M.
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General Electric Co.
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Ingersoll-Rand Co.

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Electric Service Supplies Co.

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Elec'l Testing Laboratories

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Ticket Choppers and Destroyers
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Cambria Steel Co.
Midvale Steel & Ordnance Co.

Ties, Mechanical
Dayton Mechanical Tie Co.

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Fairbanks Co., The
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Trolleys and Trolley Systems
Ford Chain Block & Mfg. Co.

Trolley Shoes
Holden & White, Inc.
Miller Trolley Shoe Co.

Trolley Wheels. (See Wheels, Trolley)

Trolley Wire
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Roebbling's Sons Co., John A.
Itome Wire Co.

Trucks, Car
American Steel Foundries
Bemis Car Truck Co.
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Tubing, Steel
National Tube Co.

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Schutte & Koerting Co.
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Railway Utility Co.
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Ohio Brass Co.
Westinghouse Traction Brake Co.

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Barrett Co., The
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Allis-Chalmers Mfg. Co.

Creosoted Poles for Permanency—

The "*permanency*" demanded of wood poles is assured by proper creosoting treatment. Proper treatment means the Open Tank process—hot and cold treatment—and insures thorough impregnation of the sapwood. Best results are assured by following the recommendations suggested herewith, and using Carbosota Creosote Oil.

Recommendations for Butt Treatment of Cedar and Chestnut Poles by the Open Tank Process

CONDITION OF POLES. Poles should be seasoned until air-dry, and otherwise conform to standard specifications.

PREPARATION OF POLES. Of the surface to be creosoted, the area between a point one to two feet above, and a point 2 to 3 feet below the future ground line should be carefully cleaned of all adhering inner bark, or other foreign substance. Parts of the exterior surface showing soft or brashy wood should be shaved clean, until sound wood is exposed.



TREATMENT. Pole-butts should be completely immersed in the preservative to a point two feet above the future ground line.

HOT TREATMENT. When treating tank has been charged, creosote oil should be admitted at a temperature of about 150 degrees F. and thereafter maintained at between 200 degrees F. and 220 degrees F. for the required period.

COLD TREATMENT. At the end of the "hot period" the cold creosote oil should be admitted until the temperature of the creosote drops a hundred degrees, whereupon the creosote oil and poles should be permitted to further cool to atmospheric temperature for the required period.

The level of oil in treating tank should be maintained uniform. Portion of pole being creosoted should not be exposed to atmosphere during treatment.

IMPREGNATION. The object of the treatment is to obtain complete impregnation of the sapwood. It should be required that the average visible penetration of the creosote oil should not be less than 50% of the depth of the sapwood ring.

Inspection should be by borings made with a Swedish increment borer, or similar instruments which recover an intact core of wood.

PRESERVATIVE. The preservative to be used should be a pure refined coal-tar creosote oil, meeting standard specifications. ("Carbosota Creosote Oil" is an identification mark—guaranteeing uniformity and efficiency.)

Green, or frozen poles should not be treated under these specifications.

TOPS, GAINS, ETC. Tops, gains and abrasions should be given a two-coat brush application of refined coal-tar creosote oil, heated to about 150 degrees F. (Note.—Small plants can give treatment in accordance with these recommendations by maintaining the required period of hot treatment, and thereafter permitting both oil and poles to cool to atmospheric temperatures.)

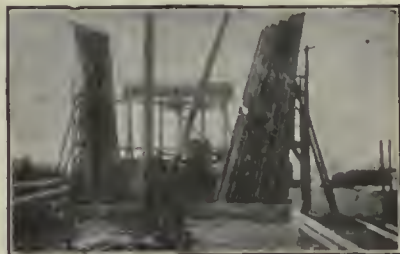
Technical service, detailed recommendations, etc., for application of wood preservation obtainable gratis by addressing nearest office.



Shaving ground line area of pole before treatment.



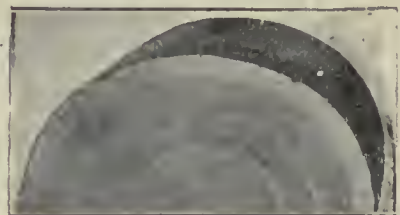
"Snaking" shaved pole to creosoting tanks



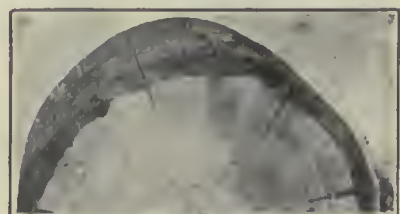
Creosoting poles by the Open Tank process



Carload of butt-treated western red cedar poles leaving creosoting plant



Dipped, short-time treatment or surface treatment



Open Tank process (hot and cold treatments) Note thorough impregnation of sapwood

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Perfect
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Like all other Columbia products the trolley wheels and trolley harps manufactured by us have as their motto Quality.

Quality first, last and always. This means to our customers that they can be assured the best the market can afford.

Our wheels and harps are made of the very best metals that can be obtained. Special attention has been given to get long wear and good lubrication. This means the elimination of high maintenance and numerous tie ups due to defective trolley harps and wheels.

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Banding and heading machines
Car hoists
Car replacers
Coil taping machines for armature leads
Coil winding machines
Pinion pullers
Pit jacks
Signal or target switches
Tension stands



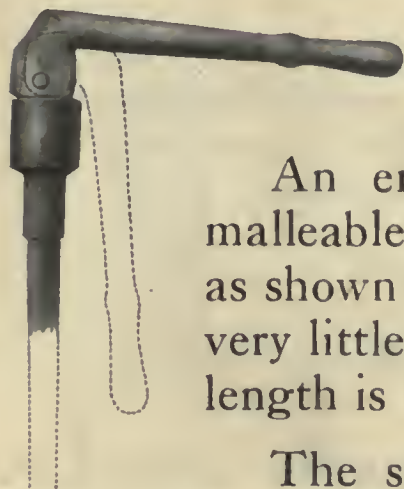
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K-24

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Electric Locomotives made and equipped by this company are doing well the work demanded of them.

One of the locomotives for Chile is shown on this page in the various stages of disassembly, transportation by rail and shipment by water.

25-30

